

# APPENDICES

## **APPENDICES**

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HIGHLIGHTS OF THE EL MALPAIS LEGISLATION  
(P.L. 100-225)

APPENDIX A

## APPENDIX A

### HIGHLIGHTS OF THE EL MALPAIS LEGISLATION (P. L. 100-225)

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#### Title I - National Monument

##### Establishment of Monument

Section 101      Designates a 114,000-acre National Monument to protect highly significant natural and cultural resources.

##### Transfer

Section 103      Transfers management of certain lands from the Cibola National Forest to the Department of the Interior to be managed as part of the National Monument.

##### Management

Section 103      National Monument will be managed according to laws of the National Park System. Management purposes of the monument are to preserve scenery and natural, historic, and cultural resources and to provide public understanding and enjoyment of these resources.

##### Permits

Section 104      Grazing privileges within the monument will end on January 1, 1998.

#### Title II - Masau Trail

##### Designation of Trail

Section 201      Authorizes the National Park Service (NPS) to designate a vehicular tour route linking prehistoric and historic cultural sites in New Mexico and eastern Arizona.

##### Areas Included

Section 202      Initially the trail will link El Malpais National Monument, El Morro National Monument, Chaco Culture National Historical Park, Aztec Ruins National Monument, Canyon de Chelly National Monument, Pecos National Monument, and Gila Cliff Dwellings National Monument. Additional trail segments designated later by the Secretary of the Interior.

##### Information and Interpretation

Section 203      The Secretary may enter into cooperative agreements to help interpret natural and cultural resources of such sites. The Secretary, in cooperation with other public, Indian, and non-profit entities, must prepare and distribute information about sites along the trail.

##### Markers

Section 204      The trail will be marked appropriately. Signs and other informational devices may be accepted as donations.

(Senate Report)      The NPS should work closely with the States of New Mexico and Arizona in establishing the trail markers, sharing the costs. If petroglyphs on the Albuquerque West Mesa are added to the National Park System, they should be incorporated into the Masau Trail.

### **Title III - El Malpais National Conservation Area**

#### **Establishment of Area**

Section 301      Establishes a 262,690-acre National Conservation Area (NCA) to be managed by the Bureau of Land Management (BLM) to protect natural, cultural, scenic, and wilderness resources of national importance.

(Senate Report)    The BLM is to erect a ranger station along NM State Road 117.

#### **Management**

Section 302(a)    The NCA shall be managed according to applicable laws.

(Senate Report)    Resource management plans referred to in this act are those required by the Federal Land Policy and Management Act (FLPMA).

Section 302(b)    Hunting and trapping are to be permitted in the conservation area, subject to limitations of the State of New Mexico.

Section 302(c)    Commercial wood collection is prohibited.

Section 302(d)    Livestock grazing will continue.

### **Title IV - Wilderness**

#### **Designation of Wilderness**

Section 401      Designates the 60,000-acre Cebolla Wilderness and the 38,210-acre West Malpais Wilderness.

#### **Management**

Section 402      Wilderness is to be managed in accordance with the Wilderness Act of 1964, and grazing is allowed to continue.

### **Title V - General Provisions**

#### **Management Plans**

Section 501(a)    Separate General Management Plans will be prepared for the monument and conservation area within 3 years. Each must include an interpretation and public education plan, a public facilities plan (providing for both a visitor center and a multi-agency orientation center), a natural and cultural resource plan, and a wildlife management plan.

(Senate Report)    Cultural resource plans will include wilderness. Appropriate forms of archeological research, including identification, excavation, stabilization, conservation, and protection of cultural resource sites will be permitted. Short-term disturbances resulting from these activities will be rehabilitated. Long-term scientific use of archeological values will conform to the concept that wilderness is devoted to recreational, scenic, scientific, educational, conservational, and historical use.

(House Report)    Wilderness is to be included in the cultural resource plans, which will provide for active identification and management of historic properties, including protection of archeological values from looting, vandalism, and artifact collection. Appropriate forms of research and related activities should be permitted in wilderness, including investigation, identification, stabilization, conservation, and protection of cultural resource sites from deterioration by natural forces or vandalism. Research should be conducted so as to minimize impacts, and short-term disturbances resulting from such activities must be rehabilitated. The BLM should consult with the Advisory Council on Historic Preservation and the State Historic Preservation Officer to establish guidelines for

identification, management, and research of historic properties within wilderness. This guidance is consistent with the Wilderness Act. The need to prevent looting and vandalism is stressed, and public support for protection, recognition, and interpretation is noted.

- Section 501(b) A 17,500-acre Wilderness Study Area is established. Wilderness potential of this area will be protected until completion of the General Management Plan, which shall include a review of the wilderness suitability of these lands and a recommendation on this subject.
- Section 501(c) All roadless areas within the National Monument (except potential development areas) will be reviewed for wilderness suitability, with a recommendation made in the General Management Plan. Pending submission of the recommendation, managers will protect wilderness potential of the areas.
- (Senate Report) Protection of wilderness values does not preclude improving access and providing interpretive and recreational facilities in areas currently penetrated by roads.
- (Senate and House Reports) The NPS should use the BLM wilderness inventory policy definition of "road" in determining which lands are "roadless." "Potential development areas" may be included in the wilderness suitability study at the discretion of the agency.
- (Senate Report) The Department of the Interior is urged to enter into a cooperative agreement with the Department of Defense to locate and clear military ordnance in the monument and conservation area.
- (House Report) The Secretary of the Interior is expected to consult with the Secretary of Defense concerning the nature and extent of unexploded ordnance in the monument and conservation area, and the cost and feasibility of removing these materials or protecting the public from them.

#### **Acquisitions**

- Section 502 The Secretary of the Interior is authorized to acquire lands and interests within the monument and conservation area. Lands owned by the State of New Mexico may be acquired only by exchange. The Congress expects acquisition of subsurface interests to be completed within 3 years.
- (Senate and House Reports) Authority to acquire lands and minerals may extend beyond 3 years. Indian trust lands may not be condemned, and Indian lands should only be acquired with the consent of the Indian owners.

#### **State Exchanges**

- Section 503(a) Upon request by the State of New Mexico, the Secretary is required to exchange state land within the monument or conservation area for equal value parcels elsewhere in the state.
- Section 503(b) Within 6 months, the Secretary will identify for the State Land Commissioner those state lands within the monument and conservation area and those federal lands that are available for transfer to the State of New Mexico in exchange. Such listing is to be updated annually. The Congress expects the land exchanges to be completed within 2 years.
- (Senate and House Reports) Authority for state exchange may extend beyond 2 years.

#### **Mineral Exchanges**

- Section 504 The Secretary is directed to exchange approximately 15,000 acres of federal mineral rights identified in the act for approximately 15,000 acres of mineral rights owned by Santa Fe Pacific Industries within the conservation area. Such exchange is to be on the basis of equal value, consistent with FLPMA, and the Secretary must determine that the exchange is in the public interest. The exchange is to be completed within 3 years.

(Senate and  
House Reports) Authority for the exchange may extend beyond 3 years.

(House Report) The Committee believes that this exchange is in the public interest and intends these provisions to facilitate the exchange, consistent with FLPMA.

#### **Acoma Pueblo Exchanges**

Section 505 Congress intends that the NPS and the BLM be sensitive to needs of Native American groups.  
(Senate and  
House Reports) Boundaries of the National Monument and Cebolla Wilderness were drawn specifically to allow continued road access to Acoma deeded land. Acoma grazing may continue for 10 years within the monument and indefinitely within the conservation area.

Section 505(a) The Secretary is authorized, at the request of Acoma Pueblo, to exchange certain lands within the conservation area or other lands of equal value outside the conservation area for Acoma trust lands west of NM State Road 117. Lands exchanged to the Acoma shall be held in trust while the acquired lands will be incorporated into the monument.

Section 505(b) Consistent with law and existing land use plans, BLM lands within New Mexico shall be available for exchange.

Section 505(c) Certain identified lands within the conservation area are available for exchange, provided Acoma Pueblo requests exchange within 1 year. Otherwise these public lands are incorporated into the conservation area and certain areas will be included in the Cebolla Wilderness.

(Senate Report) The NPS and the BLM should pursue exchanges before purchasing these lands. All lands within the conservation area need not be consolidated into federal ownership. Power of condemnation will be used to acquire lands in the conservation area only where there is an imminent threat to the purposes for which the conservation area was established. Both agencies should work cooperatively with private land owners and range users to minimize construction of permanent fences and to maintain existing access to private property, where possible.

(House Report) The 1-year deadline for the Acoma exchange involving conservation area lands is intended to minimize potential interference with proper management of the conservation area and wilderness. Additional proposals for transfer of lands in these areas to the Pueblo of Acoma are not considered necessary or desirable.

#### **Exchanges and Acquisitions Generally; Withdrawal**

Section 506(a) Generally, exchanges should be on the basis of equal value. However, the Secretary may make exceptions if they are in the public interest.

Section 506(b) "Public Lands" has the same meaning as in FLPMA.

Section 506(c) Lands or interests acquired within the monument or conservation area after enactment of this legislation shall be incorporated into the monument or conservation area.

Section 506(d) No federal lands within the monument or conservation area shall be transferred out of federal ownership or placed in trust, except as provided for in this act. Subject to valid existing rights, federal lands within the monument and conservation area are withdrawn from all forms of entry, appropriation, or disposal and from location, entry, and patent under the mining laws. They are closed to mineral and geothermal leasing.

Section 506(e) Acreages in the act are approximate; referenced maps take precedence over acreage figures.

Section 506(f) The Secretary is authorized to accept land contiguous to Pecos National Monument by donation.

Section 506(g) Capulin Mountain National Monument is redesignated Capulin Volcano National Monument, and other administrative details of records and boundaries of this monument are enacted.

#### **Access**

Section 507(a) The Secretary is required to permit access for continued traditional cultural and religious use of the monument and conservation area by Native Americans.

Section 507(b) The Secretary shall request the recommendations of Acoma Pueblo and other Indian tribes about methods of ensuring access, enhancing the privacy of traditional cultural and religious activities, and protecting traditional cultural and religious sites.

Section 507(c) The Secretary may temporarily close to public use specific, limited portions of the conservation area and monument to protect the privacy of the religious activities of Indian people. Written notification of such action must be provided to the Energy and Natural Resources Committee of the Senate, and to the Interior and Insular Affairs Committee of the House, within 7 days after initiation of any such closure.

Section 507(d) An advisory committee including representatives of Acoma, Zuni, other appropriate Indian tribes and other persons or groups may be established to advise the Secretary on these matters.

(Senate and House Reports) The Secretary must consult appropriate Indian tribes and their traditional cultural and religious authorities during preparation of the General Management Plans to determine what the traditional cultural and religious uses have been.

#### **Cooperation**

Section 508 The Secretary is authorized and encouraged to cooperate with other agencies and groups to further the interpretation of prehistoric civilizations of New Mexico and eastern Arizona. Specifically, the Secretary is encouraged to cooperate in development of a multi-agency orientation center near Grants, New Mexico.

#### **Water Rights**

Section 509 Water rights are reserved for the minimum amount of water needed to carry out the purposes for which the monument, conservation area, and wildernesses were established. This clause shall not affect any existing water right or pending application, and this subsection does not require the NPS to drill wells. Nothing in this action establishes a precedent with regard to future designations, nor does it affect interpretation of any other act or designation.

(Senate Report) The Committee reiterates that reservation of water applies only to this act and should have no bearing on interpretation of any other reserved rights doctrine. The water rights reservation is junior to those of all existing wells and pending applications. No conflicts are anticipated between the federal government's need for water and any valid existing or pending rights.

#### **Authorization**

Section 510 This section authorizes \$16.5 million for purposes of the act: \$10 million for land acquisition in the monument, \$1 million for development in the monument, \$4 million for land acquisition in the conservation area, \$1 million for development in the conservation area, and \$500,000 for planning and developing the Masau Trail.



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BLM Management Actions Since Establishment  
of the El Malpais NCA (1986)

APPENDIX B

## APPENDIX B

### BLM MANAGEMENT ACTIONS SINCE ESTABLISHMENT OF THE EL MALPAIS NCA (1987)

Action <sup>a</sup>	Completion Date(s)
Established staff for NCA; opened temporary information center w/National Park Service (NPS) in Grants.	1988
Established volunteer program to assist w/projects, provide visitor services & help staff information center.	1987
Completed exchanges w/State of New Mexico, New Mexico & Arizona Land Co., & Cerrillos Land Co. to acquire 193,697 acres of mineral estate w/in NCA & National Monument.	1987-90
Completed Land Protection Plan for NCA to guide public realty actions.	1989
Acquired 13,400 acres of surface estate w/in NCA & wilderness by exchange, purchase or donation, plus 14,000 acres contiguous to NCA & Cebolla Wilderness.	1989-94
Inventoried 40,160 acres for cultural resources @ Class II level.	1990
Issued right-of-way to Continental Divide Electric for transmission line to Ranger Station.	1990
Inventoried 320 acres of Cebolla Canyon Prehistoric Community for cultural resources @ Class III level.	1990
Designed, constructed & opened Ranger Station.	1991
Established agreement w/Southwest Natural & Cultural Heritage Association to provide & sell publications @ Ranger Station.	1991
Produced informational video on NCA & published El Malpais Recreation Guide Map.	1991
Inventoried 4,000 acres of Cerritos de Jaspe Unit for cultural resources @ Class II level.	1991
Inventoried & recorded 21 historic homestead sites.	1991
Installed monitoring station; collected air quality, meteorology & soil data as part of Intermountain Wilderness Area Ecosystem Study.	1991-96
Developed Range Improvement Maintenance Plans for Cebolla Wilderness & West Malpais Wilderness.	1991
Completed 5-year intensive monitoring of six I-category (Improve) grazing allotments in NCA.	1991
Completed ecological site inventory on Techado Mesa & Los Pilares grazing allotments.	1991
Reclassified Bright's Well Allotment from M (Maintain) to C (Custodial) category.	1991

## APPENDIX B (concl'd)

Action <sup>a</sup>	Completion Date(s)
Developed & paved La Ventana Natural Arch parking lot, installed portable toilets & improved trail.	1988-91
Fenced five historic homesteads.	1991-93
Issued joint decision w/U.S. Forest Service (USFS) on location of Continental Divide National Scenic Trail.	1992
Inventoried 760 acres of Armijo Canyon Prehistoric Community for cultural resources @ Class III level.	1992
Completed site stabilization project @ Armijo Canyon Homestead & Springhouse.	1992
Issued grazing decisions for six I-category allotments.	1992
Maintained 48 miles of roads in NCA.	1992-93
Designed & developed interpretive displays for Ranger Station.	1993
Completed brochures for West Malpais Wilderness & Chain of Craters Back Country Byway; dedicated byway.	1993
Completed stabilization project @ Dittert Site.	1993
Issued right-of-way to USFS for portion of FS Road #50.	1993
Completed management plans for Techado Mesa & Los Pilaes grazing allotments.	1993
Developed Limits of Acceptable Change (LAC) standards for recreation & wilderness.	1993
Constructed protective riparian pasture @ Cebolla Spring w/assistance from students at Southwestern Indian Polytechnic Institute.	1994
Installed vault toilets @ La Ventana Natural Arch.	1995
Completed emergency stabilization project @ Stone House in Cebolla Canyon.	1995
Issued commercial recreation permits to South Mountain Wilderness Tours & Curt Farmer Pack Llamas, who may conduct day & overnight hiking, mule or llama treks w/in NCA.	1995
Los Amigos del Malpais built two wilderness barricades, maintained trail @ La Ventana Natural Arch, & planted demonstration garden @ Ranger Station.	1995

Note: <sup>a</sup> Many of these actions were completed with significant help from Los Amigos del Malpais and other volunteer organizations. Further information is available at the Albuquerque Field Office.

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## RECREATION OPPORTUNITY SPECTRUM

# APPENDIX C

## APPENDIX C

### RECREATION OPPORTUNITY SPECTRUM

#### INTRODUCTION

The goal of the recreationist is to have satisfying leisure experiences by participating in preferred activities in favorable environmental settings. Opportunities for achieving satisfying experiences depend on natural elements such as vegetation, landscape and scenery, and conditions controlled by land-management agencies, such as developed sites, roads and regulations. The goal of the recreation resource manager then becomes to provide the opportunities to obtain such experiences by managing the natural setting and the activities within it.

The Recreation Opportunity Spectrum (ROS) is the BLM's framework to inventory, plan and manage recreational opportunities. The ROS is divided into six classes, ranging from essentially natural, low-use areas (resource-dependent recreational opportunities) to highly developed, intensive use areas (facility/vehicle-dependent recreational opportunities). Each class is defined in terms of three principal components: the environmental setting, the activities possible, and the experiences that can be achieved.

The primary factor in determining ROS classes is the setting. This describes the overall outdoor environment in which activities occur, influences the types of activities, and ultimately determines the types of recreation that can be achieved.

Activities are not completely dependent on opportunity class, and most can take place in some form throughout the spectrum. However, general activities can be characterized for each ROS class. For each person, her/his recreational experience depends on the environmental setting and individual differences based on background, education, sex, age and place of residence.

#### RECREATION OPPORTUNITY SETTINGS

The ROS encompasses a variety of recreational settings under which certain experiences are possible. Seven elements provide the basis to inventory and

delineate recreational settings. These are: access, remoteness, naturalness, facility and site management, visitor management, social encounters, and visitor impacts.

**Access**--Includes the mode of travel used within the area and influences both the level and type of recreational use an area receives.

**Remoteness**--Concerns the extent to which individuals perceive themselves removed from human activity. Vegetation or topographic variation can increase this sense of remoteness. Lack of remoteness is important for some recreational experiences.

**Naturalness**--Concerns the varying degrees of human modification of the environment. Often described in terms of scenic quality influenced by the degree of alteration of the natural landscape.

**Site Management**--Refers to the level of site development. Lack of site modifications can facilitate feelings of self-reliance and naturalness, while highly developed facilities can enhance comfort and increase the opportunity to meet and interact with others.

**Visitor Management**--Includes both regulation and control of visitors as well as providing them with information and services. A continuum of visitor management can be described, ranging from subtle techniques such as site design, to strict rules and regulations. In some recreational settings controls are expected and appropriate; in others, onsite controls detract from the desired experience.

**Social Encounters**--Involve the number and type of others met in the recreation area. Also measures the extent to which an area provides experiences for solitude or social interaction.

**Visitor Impacts**--Affect natural resources such as soil, vegetation, air, water and wildlife. Even low levels of use can produce significant ecological impacts, and these impacts can influence the visitor's experience.

## **RECREATION OPPORTUNITY CLASSES**

Based on the seven elements described above, six recreation opportunity classes have been developed and are described below. Reclassification of lands can occur in response to alternative management prescriptions.

### **Primitive**

This setting is characterized by a large-sized area of about 5,000 acres or more, lying at least 3 miles from the nearest point of motor vehicle access. It is essentially an unmodified natural landscape, with little evidence of others and almost no onsite management controls. Activities include overnight backpack camping, nature study and photography, back-country hunting, horseback riding, and hiking. The experience provides visitors with a chance to achieve solitude and isolation from human civilization, feel close to nature, and encounter a greater degree of personal risk and challenge.

### **Semi-Primitive Nonmotorized**

This setting consists of about 2,500 acres lying at least ½ mile from the nearest point of motor vehicle access. The area is predominantly a natural landscape. Where there is evidence of others, interaction is low, and few management controls exist. Activities include backpack camping, nature viewing, back-country hunting (big game, small game, and upland birds), climbing, hiking, and cross-county skiing. The experience provides for minimal contact with others, a high degree of interaction with nature and a great deal of personal risk and challenge.

### **Semi-Primitive Motorized**

This setting consists of about 2,500 acres within ½ mile of primitive roads and two-track vehicle trails. The area has a mostly natural landscape with some evidence of others (but numbers and frequency of contact seem to remain low) and few management controls. Activities include hunting, climbing, vehicle trail riding, back-country driving, mountain biking, hiking, and snowmobiling. The experience provides for isolation from human civilization, a high degree of interaction with the natural environment and a moderate degree of personal risk and challenge.

### **Roaded Natural**

This setting consists of areas near improved and maintained roads. While these areas are mostly natural in appearance, some human modifications are evident, with moderate numbers of people, visible management controls and developments. Activities include wood gathering, downhill skiing, fishing, off-highway vehicle driving, interpretive uses, picnicking, and vehicle camping. The experience provides for a sense of security through the moderate number of visitors and developments, some personal risk-taking and challenges.

### **Rural**

This setting is characterized by a substantially modified natural environment. Resource modification, development and use are obvious. Human presence is readily evident, and interaction between users is often moderate to high. Activities consist mostly of facility/vehicle-dependent recreation and generally include vehicle sightseeing, horseback riding, on-road biking, golf, swimming, picnicking, and outdoor games. The experience provides for modern visitor conveniences, moderate to high levels of interactions with others, and a feeling of security from personal risk.

### **Urban**

This setting consists of areas near paved highways, where the natural landscape is dominated by human modifications. Large numbers of users can be expected. Sights and sounds of others dominate, while management controls are numerous. Activities are facility/vehicle-dependent and include concerts, wave pools, amusement parks, zoos, vehicle racing facilities, spectator sports and indoor games. The experience provides for numerous modern conveniences, large numbers of people, interaction with an exotic and manicured environment, and a feeling of high personal security.

## **MANAGEMENT OBJECTIVES FOR ROS CLASSES**

Objectives for a specific class contain minimum guidelines and standards as well as directions

concerning the type of activities, physical and social settings, and recreational opportunities to be managed for.

### **Primitive**

The primitive class is managed to be essentially free from evidence of humans and onsite controls. Motor vehicle use within the area is not permitted. The area is managed to maintain an extremely high probability of experiencing isolation from others (not more than three to six encounters per day) and little to no managerial contact. Independence, closeness to nature, self-reliance and an environment that offers a high degree of challenge and risk characterize this class. Back-country use and management of renewable resources is subject to the protection of back-country recreational values.

### **Semi-Primitive Nonmotorized**

Semi-primitive nonmotorized areas are managed to be largely free from the evidence of humans and onsite controls. Motor vehicle use is not permitted (except as authorized). Facilities for the administration of livestock and for visitor use are allowed but limited. Project designs stress the protection of natural values and maintenance of the predominantly natural environment. Areas are managed to maintain a good probability of experiencing minimum contact with others, self-reliance through the application of back-country skills, and an environment that offers a high degree of risk and challenge.

Back-country use and management of renewable resources are dependent on maintaining naturally occurring ecosystems. The consumption of renewable resources is subject to the protection of back-country recreational values.

### **Semi-Primitive Motorized**

These areas are managed to provide a natural-appearing environment. Evidence of humans and management controls are present but subtle.

Motor vehicle use is allowed, but the concentration of users should be low. Onsite interpretive facilities, low-standard roads and trails, trailheads, and signs should stress the natural environment and be the minimum necessary to achieve objectives.

The consumption of natural resources is allowed. Effort is taken to reduce the impact of utility corri-

dors, rights-of-way, and other surface-disturbing projects on the natural environment. Frequency of managerial contact with visitors is low to moderate.

### **Roaded Natural**

Roaded natural areas are managed to provide a natural appearing environment with moderate evidence of humans. Motor vehicle use is permitted and facilities for this use are provided. Concentration of users is moderate with evidence of others prevalent. Resource modification and use practices are evident but harmonize with the natural environment.

Placement of rights-of-way, utility corridors, management facilities, and other surface-disturbing activities would be favored here over placement in semi-primitive nonmotorized and semi-primitive motorized areas. The consumption of natural resources is allowed except at developed trailheads, developed recreational areas and sites, and where geological, cultural, or natural interests prevail. Frequency of managerial contact with visitors is moderate.

### **Rural**

Rural areas are managed to provide a setting that is substantially modified with moderate to high evidence of civilization. Motor vehicle use is permitted. Concentration of users is often high with substantial evidence of others. Resource modification and use practices are mostly dominant in a somewhat manicured environment. Standards for road, highway, and facility development are high for user convenience. Frequency of managerial contact with visitors is moderate to high.

### **Urban**

Urban areas are managed to provide a setting that is largely modified. Large numbers of users can be expected, and vegetation cover is often exotic and manicured. Facilities for highly intensified motor vehicle use and parking are available, with mass transit often included to carry people throughout the site. The probability for encountering other individuals and groups is prevalent, as is the convenience of recreational opportunities. Experiencing natural environments and their challenges and risks is relatively unimportant. Opportunities for competitive and spectator sports are common.

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LIMITS OF ACCEPTABLE CHANGE



## APPENDIX D

### LIMITS OF ACCEPTABLE CHANGE

#### INTRODUCTION

As developed by George Stankey and others (1985), using Limits of Acceptable Change (LAC) is a process that requires deciding what kinds of conditions are acceptable in recreational settings, then prescribing actions to protect or achieve those conditions. The objective of the LAC system is not to prevent change but rather to control it, and to decide what management actions are required to maintain or enhance the desired conditions.

The LAC process consists of four major components: (1) specifying acceptable and achievable resource and social conditions, defined by a series of measurable parameters, (2) analyzing of the relationships between existing conditions and those judged acceptable, (3) identifying management actions necessary to achieve these conditions, and (4) a program of monitoring and evaluating management effectiveness. These four components are broken down into nine steps to ease application. Each of the nine steps is designed to achieve a particular task and provide the basis for later activities.

By following the LAC process, manager with public input identify issues and concerns that need to be resolved through the land use planning and environmental assessment processes. First they define opportunity classes, select resource and social indicators, and inventory the planning area to determine current indicator status. After this inventory, managers specify standards for the indicators within each opportunity class. The management actions needed to maintain resource and social indicators within these standards are written as prescriptions. (These may vary by alternative.) The final phase involves monitoring the indicators and comparing the results against previous measurements and acceptable standards to see if the objectives are being achieved or maintained to the desired standard. Unacceptable change signals the need for corrective management action.

#### THE ROLE OF OPPORTUNITY CLASSES

When an area contains a diversity of physical and biological features and uses, subdivisions or

opportunity classes can be applied. Within diversified areas, the type of management needed is expected to vary throughout. Opportunity classes delineate zones where different resources, social and managerial conditions will be maintained. Map D displays the four opportunity classes set for the El Malpais National Conservation Area in 1993.

#### THE ROLE OF INDICATORS

BLM managers will monitor how much change is occurring in the El Malpais NCA. They will need to look at the indicators, which are specific elements of the NCA setting that change in response to human activities.

Indicators provide quantitative documentation on how much conditions have changed, serve as tools to examine trends and highlight problems, and can act as an early warning to predict future conditions. When compared with standards that describe the acceptable limits of change, indicators can signal the need for corrective action, evaluate the effectiveness of management actions, and help determine if desired NCA conditions are being achieved.

#### Criteria For Indicator Selection

**Quantitative**--Can the indicator be measured?

**Correlated**--Does the indicator detect a change in conditions caused by humans?

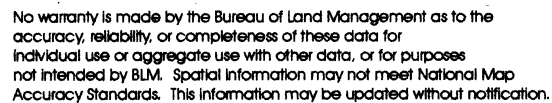
**Feasible**--Can the indicator be measured using simple equipment and sampling techniques?

**Reliable**--Can the indicator be measured consistently (i.e., will different observers collect the same information)?

**Responsive**--Does the indicator detect a change in conditions in response to management control?

**Sensitive**--Can the indicator detect a change in conditions that occur within a year?

### Opportunity Classification for Limits of Acceptable Change



**Integrated**--Does the indicator reflect the conditions of more elements than itself?

**Early Warning Ability**--Does the indicator act as an early warning, alerting managers to deteriorating conditions before unacceptable changes have occurred?

**Significance**--Does the indicator detect a change in conditions that persist for a long time (e.g., 5 years), disrupts ecosystem functioning, or reduces the future desirability of the area for visitors, researchers, grazing allottees, and other NCA users?

## THE ROLE OF STANDARDS

Standards provide a way to monitor existing and future conditions against those defined as acceptable. They establish (quantitatively, qualitatively, and judgmentally) the range of conditions or "limits of acceptable change" for each indicator.

## WHY MONITOR?

The designation of an area as an NCA does not ensure that desired conditions will be protected, or opportunities will exist for visitors to obtain a positive recreational or wilderness experience. However, the desired NCA conditions for which the BLM strives and monitors include:

- Air quality maintained at levels that meet or exceed federal and state standards.
- Water quality maintained at levels that protect aquatic ecosystems, and drinking water free from fecal contamination.
- Wildlife and plant species in natural distributions and abundances
- Outstanding opportunities for diverse recreational experience within a natural setting.
- Outstanding opportunities in wilderness for solitude, challenge, self-reliance, primitive and unconfined recreation, and scientific study.
- Natural processes operating freely in wilderness.

- The imprint of human activities substantially unnoticeable in wilderness.

Various uses will inevitably cause some change in NCA conditions. Recreational use, transportation and trail systems, livestock grazing, fire suppression, exotic species introduction, air pollution, crowding, littering and excessive regulation all can threaten the values the NCA was designated to conserve. However, change does not necessarily have to be bad. Under careful observation, some existing conditions need to change to become acceptable.

## Steps in a Monitoring Program

1. Describe the area's natural and human characteristics. Identify unique area attributes. Gather all available data.
2. Identify human activities that impact conditions. Identify issues and concerns.
3. Define goals and objectives that reflect the desired NCA conditions.
4. Select indicators of environmental and experiential conditions.
5. Describe sampling and measurement methods for each indicator.
6. Specify standards for acceptable limits of change for each indicator.
7. Inventory indicator conditions and compare with standards.
8. Identify management actions in areas where conditions need to be brought up to standard.

## NCA Monitoring Forms

The El Malpais NCA has been divided into four opportunity classes, as shown on Map D. Within each class, key monitoring locations have been identified. A standard form has been developed for each class to ensure consistency of data and decrease subjectivity. The following forms used for data collection show selected indicators, standards, sampling methods for collecting information, monitoring locations, and corrective actions to be taken when standards are exceeded for each opportunity class.

TABLE D-1

REVISED 6/95

I EL MALPAIS NATIONAL CONSERVATION AREA--LIMITS OF ACCEPTABLE CHANGE							
ELEMENT	MONITORING LOCATIONS	INDICATORS	STANDARDS	VISUAL MONITORING	PHOTO-MONITORING	ACTIONS (based on present condition)	OBSERVER RECOMMENDATIONS
<p>Opportunity Classification I</p> <p>Wilderness</p> <p>Unmodified natural environment, surface disturbance small; trails acceptable; no motorized vehicles; no facilities for user convenience; little evidence of previous recreation use.</p> <p>Compare with baseline photos &amp; data (observations)</p>	Proposed Narrows Rim Trail (Cebolla Wilderness)	Number/distribution of campsites	≤2 campsites visible within 300 feet of each campsite	Establish baseline data collection	Establish baseline inventory photos	Use "Leave No Trace" ethics	Date:
		Fire-ring density	One fire-ring/ camp-site	Visual observation of 100% for each site, 1 time/year	Establish 1 photo point/site where standard was exceeded	Increase patrols	Time:
	Armijo Canyon (Cebolla Wilderness)	Number of encounters with other groups/day	80% probability during all use periods of <3 other groups encountered/day while traveling along trails	Once during high-use period, May-September or hunting season	Photo-monitor sites 1 time/year	Increase interpretive effort using brochures, guided tours	Observer:
			80% probability during all use periods of <6 persons/group encountered/day while traveling along trails			Sign trailheads & access points outside wilderness boundary	
		Group size	80% probability during all use periods of <6 persons/group encountered/day while traveling along trails			Restrict areas for rehabilitation	
		Number of unauthorized trails (leading to Narrows Rim Trail)	2 distinct trails from designated trail (leading to Narrows Rim Trail)			Remove undesired fire rings	
		Vegetative loss	Bare mineral soil ≤100 sq. ft. at desired campsites			Collect trash	
		Trail erosion	Location of erosion or gulying ≤1 ft. /¼ mile				

TABLE D-2

REVISED 6/95

II EL MALPAIS NATIONAL CONSERVATION AREA--LIMITS OF ACCEPTABLE CHANGE							
ELEMENT	MONITORING LOCATIONS	INDICATORS	STANDARDS	VISUAL MONITORING	PHOTO-MONITORING	ACTIONS (based on present condition)	OBSERVER RECOMMENDATIONS
<p>Opportunity Classification II</p> <p>Unpaved roads &amp; trails</p> <p>Frequency of contact is low to moderate on unpaved roads &amp; trails; primitive roads &amp; motorized use are present; small isolated structures may be present; surface disturbance is limited &amp; small.</p> <p>Compare with baseline photos &amp; data (observations)</p>	Hole-in-the-Wall Cherry-Stemmed Road & Trailhead	Unauthorized trails	2 distinct trails from designated trail	Establish baseline data collection	Establish baseline inventory photos	Use "Leave No Trace" ethics & interpretive programs	Date:
	Dittert Site & Trailhead			Visual observation of 100% for each site, 1 time/year	Establish 1 photo point/site where standard was exceeded	Increase BLM patrols	Time:
	CR 42	Number of complaints concerning road or trail conditions	≤ 10 complaints /year	Once during high-use period, May-September or hunting season	Photo-monitor sites 1 time/year	Increase signing	Observer:
		Road conditions presenting safety hazard (potholes, ruts)	Seasonally monitor road conditions annually			Law enforcement actions	
		Damage to ROW, poor weather conditions	Notify County Highway Department for maintenance (CR 42)			Restrict areas for rehabilitation	
						Contact County Highway Department for road maintenance (CR 42)	
						Notify public at Ranger Station & Grants Field Station on road conditions for CR 42	

TABLE D-3

REVISED 6/95

III EL MALPAIS NATIONAL CONSERVATION AREA--LIMITS OF ACCEPTABLE CHANGE							
ELEMENT	MONITORING LOCATIONS	INDICATORS	STANDARDS	VISUAL MONITORING	PHOTO-MONITORING	ACTIONS (based on present condition)	OBSERVER RECOMMENDATIONS
<p>Opportunity Classification III</p> <p>Developed facilities</p> <p>Developed recreational facilities; facilities available for user convenience; frequency of contact is moderate to high in developed sites &amp; on roads &amp; trails; onsite controls obvious &amp; numerous.</p> <p>Compare with baseline photos &amp; data (observations)</p>	Trail at La Ventana Natural Arch	Trail width	Width $\leq$ 12 inches over design trend	Establish baseline inventory data collection	Establish baseline inventory photos	Use "Leave No Trace" ethics & interpretive programs	Date:
	Narrows Picnic Area	Trail erosion	2 locations of erosion or gullyng $\leq$ 1 ft./1/4 mi.	Visual observation of 10% for each facility, 3 times /year	Establish 1 photo point/site where standard was exceeded	Increase BLM patrols	Time:
		Unauthorized trails	2 distinct trails from designated trail	3 times during high-use period, May-September or hunting season	Photo-monitor sites 1 time/year	Establish "Public Land Watch" Program	Observer:
		Number of incidents of vandalism	$\leq$ 5 incidents of vandalism/facility			Increase signing	
		Vegetation trampled or disturbed that does not recover annually	$\leq$ 25% vegetation trampled or disturbed when compared with adjacent undisturbed area			Rehabilitate area or restrict areas for rehabilitation	
						Law enforcement actions	
						Issue permits for visitor use or reservations for Ranger Station programs	
						Keep records/data of vandalism	

TABLE D-4

REVISED 6/95

IV EL MALPAIS NATIONAL CONSERVATION AREA--LIMITS OF ACCEPTABLE CHANGE							
ELEMENT	MONITORING LOCATIONS	INDICATORS	STANDARDS	VISUAL MONITORING	PHOTO-MONITORING	ACTIONS (based on present condition)	OBSERVER RECOMMENDATIONS
<p>Opportunity Classification IV</p> <p>National Conservation Area</p> <p>Facilities for user safety &amp; resource protection; limited evidence of previous recreation use; low to moderate frequency of contact; primitive roads &amp; motorized use are present.</p> <p>Compare with baseline photos &amp; data (observations)</p>	Sand Canyon Road	Number of pieces of trash	≤25 pieces of trash/location	Establish baseline data collection	Establish baseline inventory photos	Use "Leave No Trace" ethics & interpretive programs	Date:
	Chain of Craters WSA (Cerro Piedrita, Cerro Lobo, Cerro Chato)	Number/distribution of campsites	≤3 campsites visible within 300 ft. of each campsite	Visual observation of each site, minimum 1 time/year	Establish 1 photo point/site where standard was exceeded	Increase BLM patrols	Time:
	Cerro Rendija	Number of unauthorized roads	≤2 distinct unauthorized roads from designated road in BLM road inventory	Once during high-use period, May-September or hunting season	Photo-monitor sites 1 time/year	Law enforcement action	Observer:
		Vegetative loss	Base mineral soil ≤400 sq. ft. at established campsites			Restrict areas for rehabilitation or repair	
						Operation Respect during hunting season	

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VISUAL RESOURCE MANAGEMENT  
CLASSES & OBJECTIVES

APPENDIX E



## APPENDIX E

### VISUAL RESOURCE MANAGEMENT CLASSES AND OBJECTIVES

The overall objective of Visual Resource Management (VRM) is to manage public lands administered by the Bureau of Land Management (BLM) in a manner that will protect the quality of the visual (scenic) values in accordance with Section 102(a)(8) of the Federal Land Policy and Management Act of 1976. The VRM system uses a methodical approach to inventory and manage the scenic resources of the public lands. It provides a way to identify visual (scenic) values, to establish management objectives through the Resource Management Planning process or on a case-by-case basis, and to provide timely input into proposed surface-disturbing projects.

The visual resource inventory process (BLM Manual H-8410-1) provides the BLM with a means of determining visual values. The inventory consists of a scenic quality evaluation, a sensitivity level analysis, and a delineation of distance zones. Based on these factors, BLM-administered lands are placed into one of four VRM classes.

Class I, the most highly valued, is assigned to those areas where decisions have been made to maintain a natural landscape. This includes areas such as national wilderness, the wild component of a Wild and Scenic River, scenic Areas of Critical Environmental Concern, and other congressionally and administratively designated areas.

Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance. The specific VRM class objectives provide the standards for planning, designing and evaluating actions.

The Visual Contrast Rating System (Manual Section 8431) provides a methodical way to evaluate activities and determine whether they conform with the approved VRM objectives. The degree of contrast is measured in terms of the basic elements of form, line, color, and texture in the predominant natural features of the characteristic landscape.

The VRM classes and their management objectives are as follows.

**Class I.** To preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

**Class II.** To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must mimic the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

**Class III.** To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should mimic the basic elements found in the predominant natural features of the characteristic landscape.

**Class IV.** To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be a major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic landscape elements.

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WILDLIFE SPECIES KNOWN OR POTENTIALLY  
OCCURRING WITHIN CIBOLA COUNTY  
(EL MALPAIS PLANNING AREA)

APPENDIX F

# APPENDIX F

## WILDLIFE SPECIES KNOWN OR POTENTIALLY OCCURRING WITHIN CIBOLA COUNTY (EL MALPAIS PLANNING AREA)

Common Name	Scientific Name	Status <sup>a</sup>
<u>Mammals</u>		
Abert's squirrel	<u>Sciurus aberti</u>	
badger	<u>Taxidea taxus</u>	
banner-tailed kangaroo rat	<u>Dipodomys spectabilis</u>	
big brown bat	<u>Eptesicus fuscus</u>	
<b>big free-tailed bat</b>	<u>Nyctinomops macrotis</u>	SC/BS
black bear	<u>Ursus americanus</u>	
<b>black-footed ferret</b>	<u>Mustela nigripes</u>	FE
black-tailed jack rabbit	<u>Lepus californicus</u>	
bobcat	<u>Lynx rufus</u>	
Botta's pocket gopher	<u>Thomomys bottae</u>	
brush mouse	<u>Peromyscus boylii</u>	
<b>Cebolleta southern pocket gopher</b>	<u>Thomomys umbrinus paquatae</u>	SC/BS
cliff chipmunk	<u>Eutamias dorsalis</u>	
Colorado chipmunk	<u>Eutamias quadrivittatus</u>	
coyote	<u>Canis latrans</u>	
deer mouse	<u>Peromyscus maniculatus</u>	
desert cottontail	<u>Sylvilagus audubonii</u>	
Eastern cottontail	<u>Sylvilagus floridanus</u>	
elk	<u>Cervus elphus</u>	
<b>fringed myotis</b>	<u>Myotis thysanodes</u>	SC/BS
gray fox	<u>Urocyon cinereoargenteus</u>	
Gunnison's prairie dog	<u>Cynomys gunnisoni</u>	
hoary bat	<u>Lasiurus cinereus</u>	
<b>long-eared myotis</b>	<u>Myotis evotis</u>	SC/BS
<b>long-legged myotis</b>	<u>Myotis volans</u>	SC/BS
meadow vole	<u>Microtus pennsylvanicus</u>	
Mexican free-tailed bat	<u>Tadarida brasiliensis</u>	
Mexican woodrat	<u>Neotoma mexicana</u>	
mountain lion	<u>Felis concolor</u>	
mule deer	<u>Odocoileus hemionus</u>	
Northern grasshopper mouse	<u>Onychomys leucogaster</u>	
<b>occult little brown bat</b>	<u>Myotis lucifugus occultus</u>	SC/BS
Ord's kangaroo rat	<u>Dipodomys ordii</u>	
pallid bat	<u>Antrozous pallidus</u>	
piñon mouse	<u>Peromyscus truei</u>	
porcupine	<u>Erethizon dorsatum</u>	
Plains pocket mouse	<u>Perognathus flavescens</u>	
pronghorn antelope	<u>Antilocapra americana</u>	
raccoon	<u>Procyon lotor</u>	
red squirrel	<u>Tamiasciurus hudsonicus</u>	
ringtail	<u>Bassaricus astutus</u>	
rock mouse	<u>Peromyscus difficilis</u>	
rock squirrel	<u>Spermophilus variegatus</u>	
silky pocket mouse	<u>Perognathus flavus</u>	
silver-haired bat	<u>Lasionycteris noctivagans</u>	

Common Name	Scientific Name	Status <sup>a</sup>
<u>Mammals</u> , concl'd		
<b>small-footed myotis</b>	<u>Myotis ciliolabrum</u>	SC/BS
Southern Plains woodrat	<u>Neotoma micropus</u>	
<b>spotted bat</b>	<u>Euderma maculatum</u>	SC/BS/ST
spotted ground squirrel	<u>Spermophilus spilosoma</u>	
spotted skunk	<u>Spilogale gracilis</u>	
Stephen's woodrat	<u>Neotoma stephensi</u>	
striped skunk	<u>Mephitis mephitis</u>	
Western pipistrelle	<u>Pipistrellus hesperus</u>	
Western harvest mouse	<u>Reithrodontomys megalotis</u>	
white-throated woodrat	<u>Neotoma albigula</u>	
<b>Yuma myotis</b>	<u>Myotis yumanensis</u>	SC/BS
<u>Birds</u>		
American avocet	<u>Recurvirostra americana</u>	
American bittern	<u>Botaurus lentiginosus</u>	
American coot	<u>Fulica americana</u>	
American crow	<u>Corvus brachyrhynchos</u>	
American kestrel	<u>Falco sparverius</u>	
<b>American peregrine falcon</b>	<u>Falco peregrinus anatum</u>	FE/SE
American robin	<u>Turdus migratorius</u>	
American wigeon	<u>Anas americana</u>	
acorn woodpecker	<u>Melanerpes formicivorus</u>	
<b>Arctic peregrine falcon</b>	<u>Falco peregrinus tundrius</u>	FT
ash-throated flycatcher	<u>Myiarchus cinerascens</u>	
<b>bald eagle</b>	<u>Haliaeetus leucocephalus</u>	FT/ST
band-tailed pigeon	<u>Columba fasciata</u>	
bank swallow	<u>Riparia riparia</u>	
barn owl	<u>Tyto alba</u>	
barn swallow	<u>Hirundo rustica</u>	
belted kingfisher	<u>Ceryle alcyon</u>	
Bendire's thrasher	<u>Toxostoma bendirei</u>	
Bewick's wren	<u>Thryomanes bewickii</u>	
black-billed magpie	<u>Pica pica</u>	
black-chinned hummingbird	<u>Archilochus alexandri</u>	
black-headed grosbeak	<u>Pheucticus melanocephalus</u>	
black-throated gray warbler	<u>Dendroica nigriscens</u>	
black-throated sparrow	<u>Amphispiza bilineata</u>	
blue-gray gnatcatcher	<u>Poliophtila caerulea</u>	
blue-winged teal	<u>Anas discors</u>	
Brewer's blackbird	<u>Euphagus cyanocephalus</u>	
Brewer's sparrow	<u>Spizella breweri</u>	
broad-tailed hummingbird	<u>Selasphorus platycercus</u>	
brown creeper	<u>Certhia americana</u>	
brown-headed cowbird	<u>Molothrus ater</u>	
bufflehead	<u>Bucephala albeola</u>	
Bullock's oriole	<u>Icterus bullockii</u>	
<b>burrowing owl</b>	<u>Athene cunicularia gypugea</u>	SC/BS
bushtit	<u>Psaltiriparus minimus</u>	
canvasback	<u>Aythya valisineria</u>	

Common Name	Scientific Name	Status <sup>a</sup>
<b>Birds, cont'd</b>		
canyon towhee	<u>Pipilo fuscus</u>	
canyon wren	<u>Catherpes mexicanus</u>	
Cassin's finch	<u>Carpodacus cassinii</u>	
Cassin's kingbird	<u>Tyrannus vociferans</u>	
Cassin's sparrow	<u>Aimophila cassinii</u>	
Chihuahuan raven	<u>Corvus cryptoleucus</u>	
chipping sparrow	<u>Spizella passerina</u>	
cinnamon teal	<u>Anas cyanoptera</u>	
Clark's nutcracker	<u>Nucifraga columbiana</u>	
cliff swallow	<u>Hirundo pyrrhonota</u>	
common goldeneye	<u>Bucephala clangula</u>	
common nighthawk	<u>Chordeiles minor</u>	
common poorwill	<u>Phalaenoptilus nuttallii</u>	
common raven	<u>Corvus corax</u>	
common snipe	<u>Gallinago gallinago</u>	
common yellowthroat	<u>Geothlypis trichas</u>	
Coopers's hawk	<u>Accipiter cooperii</u>	
crissal thrasher	<u>Toxostoma crissale</u>	
curve-billed thrasher	<u>Toxostoma curvirostre</u>	
dark-eyed junco	<u>Junco hyemalis</u>	
downy woodpecker	<u>Picoides pubescens</u>	
dusky flycatcher	<u>Empidonax oberholseri</u>	
European starling	<u>Sturnus vulgaris</u>	
<b>ferruginous hawk</b>	<u>Buteo regalis</u>	SC/BS
flammulated owl	<u>Otus flammeolus</u>	
Gamble's quail	<u>Callipepla gambelii</u>	
gadwall	<u>Anas strepera</u>	
golden eagle	<u>Aquila chrysaetos</u>	
Grace's warbler	<u>Dendroica graciaei</u>	
gray-breasted jay (see Mexican jay)		
gray catbird	<u>Dumatella carolinensis</u>	
<b>gray vireo</b>	<u>Vireo vicinior</u>	ST
gray flycatcher	<u>Empidonax wrightii</u>	
great blue heron	<u>Ardea herodias</u>	
great horned owl	<u>Bubo virginianus</u>	
greater roadrunner	<u>Geococcyx californianus</u>	
green-tailed towhee	<u>Pipilo chlorurus</u>	
green-winged teal	<u>Anas crecca</u>	
Hammond's flycatcher	<u>Empidonax hammondii</u>	
hepatic tanager	<u>Piranga flava</u>	
hermit thrush	<u>Catharus guttatus</u>	
horned lark	<u>Eremophila alpestris</u>	
house finch	<u>Carpodacus mexicanus</u>	
house wren	<u>Troglodytes aedon</u>	
indigo bunting	<u>Passerina cyanea</u>	
killdeer	<u>Charadrius vociferus</u>	
ladder-backed woodpecker	<u>Picoides scalaris</u>	
lazuli bunting	<u>Passerina amoena</u>	
least sandpiper	<u>Calidris minutilla</u>	
lesser goldfinch	<u>Carduelis psaltria</u>	

Common Name	Scientific Name	Status <sup>a</sup>
<b>Birds, cont'd</b>		
lesser nighthawk	<u>Chordeiles acutipennis</u>	
Lewis' woodpecker	<u>Melanerpes lewis</u>	
<b>loggerhead shrike</b>	<u>Lanius ludovicianus</u>	SC/BS
long-eared owl	<u>Asio otus</u>	
MacGillivray's warbler	<u>Oporornis tolmiei</u>	
mallard	<u>Anas platyrhynchos</u>	
marsh wren	<u>Cistothorus palustris</u>	
merlin	<u>Falco columbarius</u>	
mountain bluebird	<u>Sialia currucoides</u>	
mountain chickadee	<u>Parus gambeli</u>	
<b>mountain plover</b>	<u>Charadrius montanus</u>	FC
mourning dove	<u>Zenaida macroura</u>	
Mexican jay (gray-breasted jay)	<u>Aphelocoma ultramarina</u>	
<b>Mexican spotted owl</b>	<u>Strix occidentalis</u>	FT
Northern flicker	<u>Colaptes auratus</u>	
<b>Northern goshawk</b>	<u>Accipiter gentilis</u>	SC/BS
Northern harrier	<u>Circus cyaneus</u>	
Northern mockingbird	<u>Mimus polyglottos</u>	
Northern oriole (see Bullock's oriole)		
Northern pygmy owl	<u>Glaucidium gnoma</u>	
Northern pintail	<u>Anas acuta</u>	
Northern rough-winged swallow	<u>Stelgidopteryx serripennis</u>	
Northern saw-whet owl	<u>Aegolius acadicus</u>	
Northern shoveler	<u>Anas clypeata</u>	
orange-crowned warbler	<u>Vermivora celata</u>	
phainopepla	<u>Phainopepla nitens</u>	
pine siskin	<u>Carduelis pinus</u>	
piñon jay	<u>Gymnorhinus cyanocephalus</u>	
plain titmouse	<u>Parus inornatus</u>	
prairie falcon	<u>Falco mexicanus</u>	
pygmy nuthatch	<u>Sitta pygmaea</u>	
red-breasted nuthatch	<u>Sitta canadensis</u>	
red crossbill	<u>Loxia curvirostra</u>	
red-tailed hawk	<u>Buteo jamaicensis</u>	
red-winged blackbird	<u>Agelaius phoeniceus</u>	
rock dove	<u>Columba livia</u>	
rock wren	<u>Salpinctes obsoletus</u>	
rough-legged hawk	<u>Buteo lagopus</u>	
ruby-crowned kinglet	<u>Regulus calendula</u>	
ruddy duck	<u>Oxyura jamaicensis</u>	
rufous-crowned sparrow	<u>Aimophila ruficeps</u>	
rufous hummingbird	<u>Selasphorus rufus</u>	
rufous-sided towhee (see spotted towhee)		
sage sparrow	<u>Amphispiza belli</u>	
sage thrasher	<u>Oreoscoptes montanus</u>	
savannah sparrow	<u>Passerculus sandwichensis</u>	
Say's phoebe	<u>Sayornis saya</u>	
scaled quail	<u>Callipepla squamata</u>	
Scott's oriole	<u>Icterus parisorum</u>	
scrub jay (see Western scrub jay)		

Common Name	Scientific Name	Status <sup>a</sup>
<u>Birds, concl'd</u>		
sharp-shinned hawk	<u>Accipiter striatus</u>	
snowy egret	<u>Egretta thula</u>	
solitary sandpiper	<u>Tringa solitaria</u>	
solitary vireo	<u>Vireo solitarius</u>	
song sparrow	<u>Melospiza melodia</u>	
sora rail	<u>Porzana carolina</u>	
<b>Southwestern willow flycatcher</b>	<u>Empidonax traillii extimus</u>	FE/ST
spotted sandpiper	<u>Actitis macularia</u>	
spotted towhee (rufous-sided towhee)	<u>Pipilo maculatus</u> ( <u>Pipilo erythrophthalmus</u> )	
Steller's jay	<u>Cyanocitta stelleri</u>	
Swainson's hawk	<u>Buteo swainsoni</u>	
Townsend's solitaire	<u>Myadestes townsendi</u>	
Townsend's warbler	<u>Dendroica townsendi</u>	
turkey vulture	<u>Cathartes aura</u>	
vesper sparrow	<u>Poocetes gramineus</u>	
Virginia rail	<u>Rallus limicola</u>	
Virginia's warbler	<u>Vermivora virginiae</u>	
warbling vireo	<u>Vireo gilvus</u>	
Western bluebird	<u>Sialia mexicana</u>	
Western kingbird	<u>Tyrannus verticalis</u>	
Western meadowlark	<u>Sturnella neglecta</u>	
Western screech owl	<u>Otus kennicotti</u>	
Western scrub-jay (scrub jay)	<u>Aphelocoma californica</u> ( <u>Aphelocoma coerulescens</u> )	
Western tanager	<u>Piranga ludoviciana</u>	
Western wood-pewee	<u>Contopus sordidulus</u>	
whip-poor-will	<u>Caprimulgus vociferus</u>	
white-breasted nuthatch	<u>Sitta carolinensis</u>	
white-crowned sparrow	<u>Zonotrichia leucophrys</u>	
white-throated swift	<u>Aeronautes saxatalis</u>	
wild turkey	<u>Meleagris gallopavo</u>	
Williamson's sapsucker	<u>Sphyrapicus thyroideus</u>	
Wilson's phalarope	<u>Phalaropus tricolor</u>	
yellow-bellied sapsucker	<u>Sphyrapicus varius</u>	
yellow-breasted chat	<u>Icteria virens</u>	
yellow-headed blackbird	<u>Xanthocephalus xanthocephalus</u>	
yellow-rumped warbler	<u>Dendroica coronata</u>	
<u>Fish</u>		
<b>Zuni bluehead sucker</b>	<u>Catostomus discobolus yarrowi</u>	SC/BS/SE
<u>Amphibians</u>		
Great Plains toad	<u>Bufo cognatus</u>	
leopard frog	<u>Rana pipiens</u>	
red-spotted toad	<u>Bufo punctatus</u>	
tiger salamander	<u>Ambystoma tigrinum</u>	
Western spadefoot	<u>Scaphiopus hammondi</u>	
Woodhouse's toad	<u>Bufo woodhousei</u>	

Common Name	Scientific Name	Status <sup>a</sup>
<b>Reptiles</b>		
blackneck garter snake	<u>Thamnophis cyrtopsis</u>	
Chihuahuah whiptail	<u>Cnemidophorus exsanguis</u>	
coachwhip	<u>Masticophis flagellum</u>	
collared lizard	<u>Crotaphytus collaris</u>	
desert stripped whipsnake	<u>Masticophis taeniatus</u>	
Eastern fence lizard	<u>Sceloporus undulatus</u>	
gopher snake	<u>Pituophis catenifer</u>	
Great Plains skink	<u>Eumeces obsoletus</u>	
longnose leopard lizard	<u>Crotaphytus wislizeni</u>	
lesser earless lizard	<u>Holbrookia maculata</u>	
many lined skink	<u>Eumeces multivirgatus</u>	
night snake	<u>Hypsiglena torquata</u>	
racer	<u>Coluber constrictor</u>	
short-horned lizard	<u>Phrynosoma douglassi</u>	
side blotched lizard	<u>Uta stansburiana</u>	
<b>Texas horned lizard</b>	<u>Phrynosoma cornutum</u>	SC/BS
tree lizard	<u>Uta ornata</u>	
Western bullsnake	<u>Pituophis melanoleucus</u>	
Western diamondback rattlesnake	<u>Crotalus atrox</u>	
Western garter snake	<u>Thamnophis elegans</u>	
Western rattlesnake	<u>Crotalus viridis</u>	

Notes: <sup>a</sup> Status Codes: FE <sup>b</sup> - Federal Endangered, FT <sup>b</sup> - Federal Threatened, FC <sup>b</sup> - Federal Candidate (Old Category 1 Species), SC <sup>b</sup> - Species of Concern (Old Category 2 Species), BS <sup>c</sup> - BLM Sensitive Species, SE <sup>d</sup> - State Endangered, ST <sup>d</sup> - State Threatened.

<sup>b</sup> USDI, FWS 1995.

<sup>c</sup> USDI, BLM 1996.

<sup>d</sup> NMDG&F 1996.



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COMMON & SPECIAL-STATUS PLANT SPECIES (VASCULAR)  
KNOWN OR POTENTIALLY OCCURRING WITHIN  
CIBOLA COUNTY (EL MALPAIS PLANNING AREA)

# APPENDIX G

## COMMON AND SPECIAL-STATUS PLANT SPECIES (VASCULAR) KNOWN OR POTENTIALLY OCCURRING WITHIN CIBOLA COUNTY (EL MALPAIS PLANNING AREA) <sup>a, b</sup>

Common Name	Scientific Name	Status <sup>c</sup>
GRASSES/FORBS		
<u>Forbs</u>		
Eaton's lip-fern	<u>Cheilanthes eatonii</u>	
slender lip-fern	<u>Cheilanthes feei</u>	
Fendler's lip-fern	<u>Cheilanthes fendleri</u>	
purple cliffbrake	<u>Pellaea atropurpurea</u>	
grass fern	<u>Asplenium septentrionale</u>	
maidenhair spleenwort	<u>Asplenium trichomanes</u>	
rockfern	<u>Woodsia plummerae</u>	
pussytoes	<u>Antennaria plantaginifolia</u>	
ragleaf bahia	<u>Bahia dissecta</u>	
horseweed	<u>Conyza canadensis</u>	
<b>Acoma fleabane</b>	<u>Erigeron acomanus</u>	SC/BS/SS
spreading fleabane	<u>Erigeron divergens</u>	
<b>Zuni (rhizome) fleabane</b>	<u>Erigeron rhizomatus</u>	FT/SE
fleabane	<u>Erigeron vetensis</u>	
white thoroughwort	<u>Eupatorium herbaceum</u>	
<b>puzzle sunflower</b>	<u>Helianthus paradoxus</u>	FC/SE
hairy goldenaster	<u>Heterotheca villosa</u>	
hawkweed	<u>Hieracium fendleri</u>	
white ragweed	<u>Hymenopappus filifolius</u>	
silver sunflower	<u>Hymenoxys argentea</u>	
Colorado rubberweed	<u>Hymenoxys richardsonii</u>	
white aster	<u>Leucelene ericoides</u>	
aster	<u>Machaeranthera linearis</u>	
spiny goldenweed	<u>Machaeranthera pinnatifida</u>	
Tahoka daisy	<u>Machaeranthera tanacetifolia</u>	
tailleaf pericome	<u>Pericome caudata</u>	
greenstem paperflower	<u>Psilostrophe sparsiflora</u>	
lavendar thistle	<u>Cirsium neomexicanum</u>	
groundsel	<u>Senecio multicapitatus</u>	
lobeleaf groundsel	<u>Senecio multilobatus</u>	
Wright's goldenrod	<u>Solidago wrightii</u>	
common sow-thistle	<u>Sonchus oleraceus</u>	
slender daisy	<u>Townsendia leptotes</u>	
annual goldeneye	<u>Viguiera annua</u>	
yellow hiddenflower	<u>Cryptantha flava</u>	
James' hiddenflower	<u>Cryptantha jamesii</u>	
stickweed	<u>Lappula redowskii</u>	
puccoon	<u>Lithospermum incisum</u>	
Fendler rockcress	<u>Arabis fendleri</u>	
Richardson's tansy mustard	<u>Descurainia richardsonii</u>	
spectacle pod	<u>Dithyrea wislizenii</u>	
Western wallflower	<u>Erysimum capitatum</u>	
Fendler's bladderpod	<u>Lesquerella intermedia</u>	

APPENDIX G (cont'd)

Common Name	Scientific Name	Status <sup>c</sup>
<u>Forbs</u> , cont'd		
narrow-leaf mustard	<u>Thelypodopsis linearifolia</u>	
(none)	<u>Thelypodium wrightii</u>	
wild candytuft	<u>Thlaspi montanum</u>	
Fendler's sandwort	<u>Arenaria fendleri</u>	
sandwort	<u>Arenaria lanuginosa</u>	
Mexican campion	<u>Silene laciniata</u>	
narrow-leaved goosefoot	<u>Chenopodium leptophyllum</u>	
dayflower	<u>Commelina erecta</u>	
Western spiderwort	<u>Tradescantia occidentalis</u>	
pinedrops	<u>Pterospora andromedea</u>	
rattlesnake weed	<u>Chamaesyce chaetocalyx</u>	
thymeleaf spurge	<u>Chamaesyce serpyllifolia</u>	
spurge	<u>Euphorbia lurida</u>	
enema weed	<u>Astragalus humistratus</u>	
<b>Zuni milkvetch</b>	<u>Astragalus missouriensis</u>	SS
deervetch	<u>Lotus nummularius</u>	
silvery lupine	<u>Lupinus argenteus</u>	
American vetch	<u>Vicia americana</u>	
<b>catchfly gentian</b>	<u>Eustoma exaltatum</u>	SE
purple geranium	<u>Geranium eremophilum</u>	
white geranium	<u>Geranium lentum</u>	
blue scorpionweed	<u>Phacelia coerulea</u>	
<b>cinder cone phacelia (scorpionweed)</b>	<u>Phacelia serrata</u>	SC/BS
Inland rush	<u>Juncus interior</u>	
pale horsemint	<u>Agastache pallidiflora</u>	
false pennyroyal	<u>Hedeoma drummondii</u>	
beebalm	<u>Monarda punctata</u>	
craglily	<u>Anthericum torreyi</u>	
Plains flax	<u>Linum puberulum</u>	
<b>gypsum blazing star</b>	<u>Mentzelia perennis</u>	SS
globemallow	<u>Sphaeralcea digitata</u>	
Fendler's globemallow	<u>Sphaeralcea fendleri</u>	
four-o'clock	<u>Mirabilis diffusa</u>	
desert four-o'clock	<u>Mirabilis linearis</u>	
Silvestre four-o'clock	<u>Mirabilis multiflora</u>	
umbrellawort	<u>Mirabilis oxybaphoides</u>	
tufted evening primrose	<u>Oenothera caespitosa</u>	
evening primrose	<u>Oenothera coronopifolia</u>	
spike broomrape	<u>Orobanche ludoviciana</u>	
pale trumpets	<u>Ipomopsis longiflora</u>	
woody dogretch	<u>Ipomopsis multiflora</u>	
winged buckwheat	<u>Eriogonum alatum</u>	
annual buckwheat	<u>Eriogonum annuum</u>	
wild buckwheat	<u>Eriogonum hieracifolium</u>	
antelope-sage	<u>Eriogonum jamesii</u>	
<b>marsh rosemary</b>	<u>Limonium limbatum</u>	SS
Northern fairy candelabra	<u>Androsace septentrionalis</u>	
Plains larkspur	<u>Delphinium virescens</u>	

APPENDIX G (cont'd)

Common Name	Scientific Name	Status <sup>c</sup>
<u>Forbs, concl'd</u>		
Fendler's meadowrue	<u>Thalictrum fendleri</u>	
Pennsylvania cinquefoil	<u>Potentilla pennsylvanica</u>	
desert innocence	<u>Hedyotis rubra</u>	
alumroot	<u>Heuchera parvifolia</u>	
wholeleaf paintbrush	<u>Castilleja integra</u>	
beardlip penstemon	<u>Penstemon barbatus</u>	
<b>meadow penstemon</b>	<u>Penstemon oliganthus</u>	SS
wandbloom beardtongue	<u>Penstemon virgatus</u>	
(none)	<u>Schistophragma intermedia</u>	
spikemoss	<u>Selaginella densa</u>	
desert verberna	<u>Glandularia wrightii</u>	
Western sagebrush	<u>Artemisia campestris</u>	
flat sagebrush	<u>Artemisia carruthii</u>	
Mexican sagebrush	<u>Artemisia ludoviciana</u>	
threadleaf groundsel	<u>Senecio douglasii</u>	
Riddelli's groundsel	<u>Senecio riddellii</u>	
rough menodora	<u>Menodora scabra</u>	
<u>Grasses &amp; Grasslike Plants</u>		
Western wheatgrass	<u>Agropyron smithii</u>	
big bluestem	<u>Andropogon gerardii</u>	
Fendler threeawn	<u>Aristida fendleriana</u>	
pine dropseed	<u>Blepharoneuron tricholepis</u>	
sideoats grama	<u>Bouteloua curtipendula</u>	
black grama	<u>Bouteloua eriopoda</u>	
blue grama	<u>Bouteloua gracilis</u>	
hairy grama	<u>Bouteloua hirsuta</u>	
red brome	<u>Bromus lanatipes</u>	
sedge	<u>Carex eleocharis</u>	
threadleaf sedge	<u>Carex filifolia</u>	
Rocky Mountain sedge	<u>Carex occidentalis</u>	
Fendler's flat sedge	<u>Cyperus fendlerianus</u>	
flat sedge	<u>Cyperus schweinitzii</u>	
spike pappusgrass	<u>Enneapogon desvauxii</u>	
hairy tridens	<u>Erioneuron pilosum</u>	
Idaho fescue	<u>Festuca idahoensis</u>	
galleta grass	<u>Hilaria jamesii</u>	
foxtail barley	<u>Hordeum jubatum</u>	
Junegrass	<u>Koeleria cristata</u>	
wolftail	<u>Lycurus phleoides</u>	
muhly	<u>Muhlenbergia fragilis</u>	
mat muhly	<u>Muhlenbergia richardsonis</u>	
mountain muhly	<u>Muhlenbergia montana</u>	
spike muhly	<u>Muhlenbergia wrightii</u>	
New Mexico muhly	<u>Muhlenbergia pauciflora</u>	
sandhill muhly	<u>Muhlenbergia pungens</u>	
Indian ricegrass	<u>Oryzopsis hymenoides</u>	
littleseed	<u>Oryzopsis micrantha</u>	

APPENDIX G (cont'd)

Common Name	Scientific Name	Status <sup>c</sup>
<u>Grasses &amp; Grasslike Plants, concl'd</u>		
muttongrass	<u>Poa fendleriana</u>	
<b>Parish's alkali grass</b>	<u>Puccinellia parishii</u>	PE/SE
little bluestem	<u>Schizachyrium scoparium</u>	
bottlebrush squirreltail	<u>Sitanion hystrix</u>	
alkali sacaton	<u>Sporobolus airoides</u>	
sand dropseed	<u>Sporobolus cryptandrus</u>	
New Mexico porcupine grass	<u>Stipa neomexicana</u>	
<u>SHRUBS (Shrubs, half shrubs, vines &amp; cacti)</u>		
skunkbush sumac	<u>Rhus trilobata</u>	
slender gray sagebrush (Bigelow sage)	<u>Artemisia bigelovii</u>	
sand sagebrush	<u>Artemisia filifolia</u>	
fringed sagebrush	<u>Artemisia frigida</u>	
short-leaved brickelbush	<u>Brickellia brachyphylla</u>	
California brickelbush	<u>Brickellia californica</u>	
tasseflower brickelbush	<u>Brickellia grandiflora</u>	
(none)	<u>Chrysothamnus nauseosus greenei</u>	
rubber rabbitbrush	<u>Chrysothamnus nauseosus</u> Var. <u>albicaulis</u>	
rubber rabbitbrush	<u>Chrysothamnus nauseosus</u> Var. <u>bigelovii</u>	
broom snakeweed	<u>Gutierrezia sarothrae</u>	
gray horsebrush	<u>Tetradymia canescens</u>	
snowberry	<u>Symphoricarpos oreophilus</u>	
fourwing saltbush	<u>Atriplex canescens</u>	
winterfat	<u>Ceratoides lanata</u>	
feather indigobush	<u>Dalea formosa</u>	
wavyleaf oak	<u>Quercus pauciloba</u> Var. <u>undulata</u>	
wax current	<u>Ribes cereum</u>	
cliff fendlerbush	<u>Fendlera wrightii</u>	
flowering ash	<u>Fraxinus cuspidata</u>	
Western virgin's bower	<u>Clematis ligusticifolia</u>	
silver-leaf mountain-mahogany	<u>Cerocarpus montanus</u> Var. <u>argenteus</u>	
alder-leaf mountain-mahogany	<u>Cerocarpus montanus</u> Var. <u>montanus</u>	
Apache plume	<u>Fallugia paradoxa</u>	
rock spirea	<u>Holodiscus dumosus</u>	
pale wolfberry	<u>Lycium pallidum</u>	
Virginia creeper	<u>Parthenocissus inserta</u>	
New Mexico wild olive	<u>Forestiera neomexicana</u>	
Western black chokecherry	<u>Prunus virginiana</u>	
fineleaf yucca	<u>Yucca angustissima</u>	
banana yucca	<u>Yucca baccata</u>	
Wright's pincushion cactus	<u>Mammillaria wrightii</u> Var. <u>wrightii</u>	
pincushion cactus	<u>Coryphantha vivipara</u>	
Fendler's hedgehog cactus	<u>Echinocereus fendleri</u>	
claret-cup cactus	<u>Echinocereus triglochidiatus</u> Var. <u>Melanacanthus</u>	
claret-cup hedgehog	<u>Echinocereus triglochidiatus</u> Var. <u>Triglochidiatus</u>	
tree cholla	<u>Opuntia imbricata</u>	
berry pricklypear	<u>Opuntia phaeacantha</u>	
central pricklypear	<u>Opuntia polycantha</u>	

APPENDIX G (concl'd)

Common Name	Scientific Name	Status <sup>c</sup>
SHRUBS, concl'd		
<b>Santa Fe cholla</b>	<u>Opuntia viridiflora</u>	SC/BS
<b>grama grass cactus</b>	<u>Pediocactus papyracanthus</u>	SC/BS/SE
<b>small-flower devil's claw</b>	<u>Sclerocactus parviflorus</u>	SE
TREES		
Douglas fir	<u>Pseudotsuga mensiesii</u>	
alligator juniper	<u>Juniperus deppeana</u>	
oneseed juniper	<u>Juniperus monosperma</u>	
Rocky Mountain juniper	<u>Juniperus scopulorum</u>	
Gambel oak	<u>Quercus gambelii</u>	
piñon pine	<u>Pinus edulis</u>	
ponderosa pine	<u>Pinus ponderosa</u>	
netleaf hackberry	<u>Celtis reticulata</u>	
quaking aspen	<u>Populus tremnoides</u>	
Fremont cottonwood	<u>Populus fremontii</u>	

- Notes: <sup>a</sup> This list includes only common species and is not comprehensive, except for special-status species.  
<sup>b</sup> Sources: Francis & Williams 1988; Sivinski & Lightfoot 1992; USDI, FWS 1995, 1996; Vincent 1997.  
<sup>c</sup> Status Codes: FE <sup>d</sup> - Federal Endangered, FT <sup>d</sup> - Federal Threatened, PE <sup>d</sup> - Proposed Endangered, FC <sup>d</sup> - Federal Candidate (Old Category 1 Species), SC <sup>d</sup> - Species of Concern (Old Category 2 Species), BS <sup>e</sup> - BLM Sensitive Species, SE <sup>f</sup> - State Endangered, SS <sup>f</sup> - State Sensitive.  
<sup>d</sup> USDI, FWS 1995.  
<sup>e</sup> USDI, BLM 1996.  
<sup>f</sup> Sivinski & Lightfoot 1992.

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## SUMMARY OF LAND PROTECTION PLAN

# APPENDIX H

## APPENDIX H

### SUMMARY OF LAND PROTECTION PLAN

#### INTRODUCTION

The BLM has prepared a Land Protection Plan for the El Malpais National Conservation Area (NCA) to provide strategies and priorities for the protection and preservation of resources, and for visitor use on nonfederal lands. This appendix summarizes the BLM's Final Land Protection Plan which was published in September 1989. The Final Land Protection Plan is incorporated by reference into this El Malpais Plan.

The Land Protection Plan was prepared to determine what land inside the boundary of the NCA needed to be in public ownership, as well as investigating other means of protection besides acquisition to achieve NCA purposes as established by the Congress. The plan is used to facilitate opportunities to protect the NCA through cooperation with state and local governments, landowners, and the private sector. It assists the BLM in identifying priorities for funding to protect public and private resources.

The Land Protection Plan also informs landowners about the BLM's intentions to acquire land or protect it through other means. Land protection priorities are identified, and requests for acquisition funds are based on these priorities.

*It must be emphasized that the Land Protection Plan is not an offer to purchase land or interests in land.* Rather, it serves to guide future protection efforts, subject to the availability of funds and other constraints. The plan in no way diminishes the rights of nonfederal landowners. The public has been encouraged to comment on the Land Protection Plan and to aid in its revision.

#### ISSUES SUMMARY

A summary of the issues regarding private land use within the NCA follows.

1. About 96,800 acres of privately owned mineral estate underlying federally owned surface is spread in a checkerboard pattern over much of the NCA.
2. Some lands within or adjacent to the Cebolla Wilderness, the West Malpais Wilderness, and the El Malpais National Monument are privately owned.
3. Cebolla Spring and the related marsh are key components of the Cebolla Canyon riparian habitat and are privately owned.
4. Control of the scenic quality along New Mexico Highway (NM) 117, Interstate (I) 40, New Mexico Highway (NM) 53 and County Road (CR) 42 is important to maintain the integrity of the NCA.
5. Lands containing some valuable natural and/or cultural resources, such as scattered parcels in the Brazo, Cerritos de Jaspe, and Breaks Units are privately owned.
6. Approximately 800 acres of Acoma Tribal Trust lands have been included within the boundaries of the NCA. Protecting Acoma concerns and the NCA is important.
7. An industrial park is being planned on private land that lies mostly within the NCA, to the northwest of the proposed Multiagency Center.



## FUNDING & ACQUISITIONS PLANNED

TABLE H-1

### LAND PROTECTION PLAN ACQUISITION ACREAGE AND FUNDING

Item	Surface Acreage	Mineral Acreage
<u>Current Ownership (NCA)</u>		
Federal	213,600	165,800
Private	48,200	96,800
Acoma Indian Tribe	<u>800</u>	<u>      </u>
Total	262,600	262,600
<u>Proposed Method of Protection</u> <sup>a</sup>		
Exchange or Fee Acquisition	14,500	96,800
Scenic & Conservation Easements	9,100	
Statutory Acreage Ceiling	None	
<b>Funding Status</b>		<b>Millions of \$\$</b>
Authorized Acquisition Ceiling		4
Appropriated to 1989		1
Proposed for FY 1990		1.25

Note: <sup>a</sup> The Land Protection Plan summarized here contains complete recommendations for only the first four protection priorities discussed below.

## LAND PROTECTION RECOMMENDATIONS

The recommendations in the Land Protection Plan are based on legislative intent and direction established by the El Malpais legislation, Public Law (PL) 100-225. This law requires the BLM to protect important natural, cultural, scenic and scientific values within the designated boundaries of the NCA, but does not direct the agency to consolidate all land within the NCA into federal ownership.

The Congress intended that when the BLM seeks to acquire private land within the NCA, the consent of the property owner be obtained. This consent requirement applies unless an imminent threat exists that the land is to be developed in a manner detrimental to the purposes for which the NCA was established.

A combination of protection methods should be used to protect NCA resources on private lands.

As authorized by Sections 502 through 506 of P.L. 100-225, the BLM can acquire lands or interests in lands (mineral estate) by the following four methods: donation, purchase with donated or appropriated funds, exchange, and transfer from any other federal agency. Cooperative agreements can also be used to protect privately owned resources.

The following priorities for land protection and/or acquisition have been identified. Priorities could shift with changing conditions and knowledge. Immediate threats on privately owned lands containing important natural and/or cultural resources could also cause a shift in priorities. Other opportunities for protecting resources on private lands through cooperative agreements or technical assistance have not been identified as priorities, but will be pursued as appropriate.

1. The first priority for acquisition, preferably by exchange, includes all subsurface private interest

within the NCA.

Mineral development within NCA boundaries is incompatible with the area's Congressionally mandated goals and purposes. Federal minerals have been withdrawn, and acquisition of private minerals would provide the same protection to the nonfederal parcels. Mineral exchanges and fee acquisition have already been completed with the principal subsurface landowners (the New Mexico and Arizona Land Company, and the Cerrillos Land Company).

2. The second priority for acquisition, preferably by exchange, includes all private inholdings and edgeholdings within and adjacent to the Cebolla Wilderness, as well as most inholdings and one edgeholding adjacent to the West Malpais Wilderness.

Acquisition of private inholdings would prevent any detrimental changes in land use and improve manageability. Acquisition of the edgeholdings would provide access into wilderness.

Especially important in the NCA is acquisition of private edgeholdings in the Breaks Unit that provide access into the Cebolla Wilderness. Acquisition and rehabilitation of Cebolla Spring and the Cebolla Spring riparian area in the Cebolla Wilderness and the Brazo and Breaks Units would ensure protection of a critical riparian area. The private portion of the Pinole Site in the Breaks Unit would be acquired. The "Old Hughes Place," a historical homestead in the Brazo Unit, may also merit preservation.

The inholding in Section 1, T. 6 N., R. 12 W. of the West Malpais Wilderness is not included in this priority because a house and barn have been built there. Most edgeholdings to the West Malpais Wilderness are not included because major range improvements exist on them.

3. The third priority is acquisition of scenic and/or conservation easements along the federal, state, and county highways passing through the NCA.

Commercial development and visual intrusions along the roadways (e.g., billboards) are incompatible with the goals and purposes of the NCA. Protection of the viewshed along NM 117 in the Neck Unit, the scenic gateway to the NCA, is most important.

Also to be protected are the viewsheds along I-40 and NM 53 in the Neck Unit, and along portions of CR 42 in the Continental Divide Unit.

4. The fourth priority is the Acoma Exchange, if initiated by the Pueblo of Acoma. This exchange is mandated by P.L. 100-225 if requested by the Acomas.

5. The fifth priority for acquisition is lands containing natural and/or cultural resources that require management or protection, and lands needed for visitor access and facility development.

For those areas where private uses are incompatible with NCA goals and purposes, or where important resources are located, acquisition may be the only feasible means of protection. All private inholdings in the Brazo and Breaks Units should be acquired. However, other options such as cooperative agreements and easements may be explored. Exchange is the preferred method of acquisition.

In the Cerritos de Jaspe Unit, the trailhead for the Outlaw Trail is on private land, as is part of the Bandera Flow. Extremely destructive unscientific excavation of cultural resources has occurred on private land in this unit. Under this priority, the BLM would acquire any private land in Cerritos de Jaspe offered by owners.

Surface inholdings owned by the New Mexico-Arizona Land Company in the Continental Divide Unit, as well as private land owned by any other willing sellers, would be acquired under this priority. The BLM does not plan to acquire lands in the heavily subdivided areas of the Continental Divide Unit.

6. The sixth priority is protection of private lands and resources within the NCA to benefit resources within the El Malpais National Monument.

Any development visible from CR 42 in the Continental Divide Unit would intrude on the natural scenic quality of the National Monument. Acquisition of scenic or conservation easements along CR 42 would protect the viewshed in the monument.

Proliferation of access roads into the subdivided areas within and west of the Continental Divide Unit of the NCA would also intrude on the natural scenic

quality of the National Monument. The BLM and the NPS will work with Cibola County and local landowners to limit the number of access roads across the National Monument and NCA, while still providing access from outside.

7. The seventh priority is lands on which no immediate threat to natural or cultural resources exists.

As lands become available in these other areas, they will be evaluated for their suitability for

acquisition. Only exchange and sale proposals from private landowners that are in the best interest of the federal government and that meet the goals of the NCA will be pursued.

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CHAIN OF CRATERS WILDERNESS ANALYSIS  
& SUITABILITY REPORT

APPENDIX I

## APPENDIX I

### CHAIN OF CRATERS WILDERNESS ANALYSIS AND SUITABILITY REPORT

#### GENERAL DESCRIPTION

On December 31, 1987, the Chain of Craters area was designated a Wilderness Study Area (WSA) by the El Malpais legislation, Public Law (P.L.) 100-225. Section 501(b)(1) of P.L. 100-225 directs the Bureau of Land Management (BLM) to review the Chain of Craters for its suitability as wilderness and submit a recommendation to the Congress.

The Chain of Craters WSA is located within the western portion of the El Malpais National Conservation Area (NCA) in north-central Cibola County, approximately 26 air miles southwest of Grants, New Mexico (refer to Map I-1). The unit is situated along the western edge of the North Plains, a topographically closed basin. The Continental Divide crosses the northern and central portions of the WSA. Topographic relief is created by numerous cinder cones that rise over a high plain. The highest point, Cerro Lobo, reaches an elevation of 8,345 feet. A natural, closed basin at the southern end of the WSA occurs at an elevation of 7,380 feet. Maximum relief is approximately 867 feet.

Precipitation averages 12 inches annually, with the majority occurring in July and August. The driest months are generally May and June. Winters are rather cold, summers are warm, and days are mostly sunny. Daily temperatures vary by 30 to 40 degrees. The average temperature for the warmest month (July) is 70 degrees Fahrenheit, and for the coldest month (January) is 32 degrees Fahrenheit (Roybal, et al. 1984).

The Chain of Craters contains approximately 18,300 acres of publicly owned surface and subsurface estate administered by the BLM. No private surface or subsurface estate exists within the unit (refer to Map I-2).

The western edge of the Chain of Craters WSA borders Ramah Navajo Indian lands and forms the western boundary of the NCA. Private lands are scattered just outside the WSA boundary. A quarter-section of land in Section 28, which borders the Chain of Craters on its northeast side, has been subdivided and contains approximately 600 lots. How-

ever, the subdivision has not yet been extensively developed.

The Chain of Craters WSA can be reached from County Road (CR) 42, which is accessed from New Mexico (NM) 53 on the north and NM 117 on the south. Access to the Chain of Craters is largely controlled by the condition of CR 42. The road is maintained by occasional blading; however, water collects on portions of the roadbed during wet periods, making it impassable during and after storms.

#### EXISTING RESOURCES, USES & ENVIRONMENT

##### Geology & Topography

The Chain of Craters is a series of volcanic cones and craters aligned along a large-scale zone of structural strain (shear). This zone consists of north-east- and north-trending faults, creating areas of weakness where basaltic magma has flowed to the earth's surface.

The Chain of Craters is a small portion of the Zuni-Bandera volcanic field where the structural shear zone has concentrated volcanic activity (Laughlin, et al. 1982). Activity occurred most recently within the last 1,000 years. Evidence indicates that the magma producing the volcanic features in the Zuni-Bandera field was generated at great depths in the earth's mantle. Analysis of geophysical data suggest a shallow (3.5-km) magma body occurs in this area. The cinder cones within the Chain of Craters are thought to be associated with the northeastern edge of the hypothesized magma body (Ander 1980). The cones formed as volcanic debris was ejected from vents and built up steep-sided slopes. Many of the cones have collapsed along one side.

Basalt and scoria are present in the WSA but are not considered significant resources because they also exist outside the unit and the NCA (Biggsby and Maxwell, 1981). Despite geologic and geophysical evidence for geothermal potential, the Chain of Craters is not included in any classification scheme for geothermal energy development. Neither the U.S.

Geological Survey nor the New Mexico State Land Office has included the area in Known Geothermal Resource Areas or Known Geothermal Resource Fields (McLemore, et al. 1986).

### **Water Resources**

No perennial streams flow within the WSA. Unnamed ephemeral streams drain east and south away from the cinder cones into low-lying basins near the WSA boundaries. Most streamflow results from infrequent storms and snowmelt that vary from year to year. Mean annual runoff ranges from 0.1 to 0.5 inches (Roybal, et al. 1984).

Hydrologically, the WSA is part of a closed basin with no outflow of surface water. Water collects in low-lying areas where shallow lakes periodically form. Lake depth, areal extent, and longevity are controlled by the amount of precipitation and the evaporation rate.

Developed waters within the unit consist of dirt and metal tanks for livestock operations, and metal catchments for wildlife. Some metal tanks for livestock are connected to buried pipeline systems. These tanks are supplied by a water well on a private section outside the unit, and another on public land (T. 7 N., R. 13 W., Sec. 34 NW¼) within ¼ mile of CR 42 on the east side of the WSA.

The northern portion of the Chain of Craters is located within the Bluewater Underground Water Basin, while the southern portion is in the Rio Grande Underground Water Basin. These basins are administrative entities established by the New Mexico State Engineer to help regulate the appropriation of groundwater.

### **Soils**

Four soil groupings occur in the WSA. Groupings found on the cinder cones are gravelly, cobbly loams of colluvium or windblown sediments that are derived predominantly from unconsolidated cinders or basalt. Ridges between cinder cones and lower slopes are covered in sandy, cobbly loams that are very stony in places. These loams are a mixture of alluvium and windblown sediments covering basalt.

At lower elevations, fans and swales spread from the cinder cones to flats and valley bottoms. Soil groupings in these areas range from fine sandy loams

of mixed alluvium, to light brown sandy clay loams and olive brown clays. Overuse could encourage overland flow to channelize and create gullies.

Under ponderosa pine forest soils on the cinder cones tend to have slow to moderate permeability. Runoff is slow to medium, with erosion potential slight to moderate. Lower slopes and ridges in the piñon-juniper areas tend to have soils of slow permeability. Runoff is slow to medium, with erosion potential slight to moderate. The deep, well-drained soils of the brushy flats tend to have moderate erosion potential.

Water erosion is evident within the unit, with rates between .2 and .5 acre-feet per square mile (Roybal, et al. 1984). However, compared to the east side of the NCA, with erosion rates of .5 to 1 acre-feet per square mile, erosion in the Chain of Craters is less severe. Some vehicular ways are downcut to the point they are impassable. Where gully development has occurred, some two-tracks may skirt the developing gully.

### **Vegetation**

The Chain of Craters contains three general vegetative types, according to the Bailey-Kuchler classification system. These are ponderosa pine, piñon-juniper woodland, and grama-galleta steppe. (The BLM has selected the Bailey-Kuchler Ecosystem classification system of the United States because it facilitates planning at a national level and provides a broad synthesis of current knowledge about the ecosystem geography of the country. It also serves as a useful reference for those who want an overview of ecosystem and landform representation in existing and potential parts of the National Wilderness Preservation System.)

#### **Ponderosa Pine**

Located on the upper slopes of the cinder cones at elevations of 7,300 to 8,300 feet, this vegetation type covers approximately 5,500 acres. Slopes range from 1 to 55 percent.

The forest is actually a mixed conifer woodland that combines ponderosa pine, piñon, alligator bark juniper, and other juniper species. Slope and aspect determine if ponderosa or piñon will be the dominant tree species at any site. The occurrence of alligator bark junipers in the WSA constitutes the northeastern extension of this species' range.

108 22'30" 15' 108 45' 107 37'30" 35 15' 35 15'

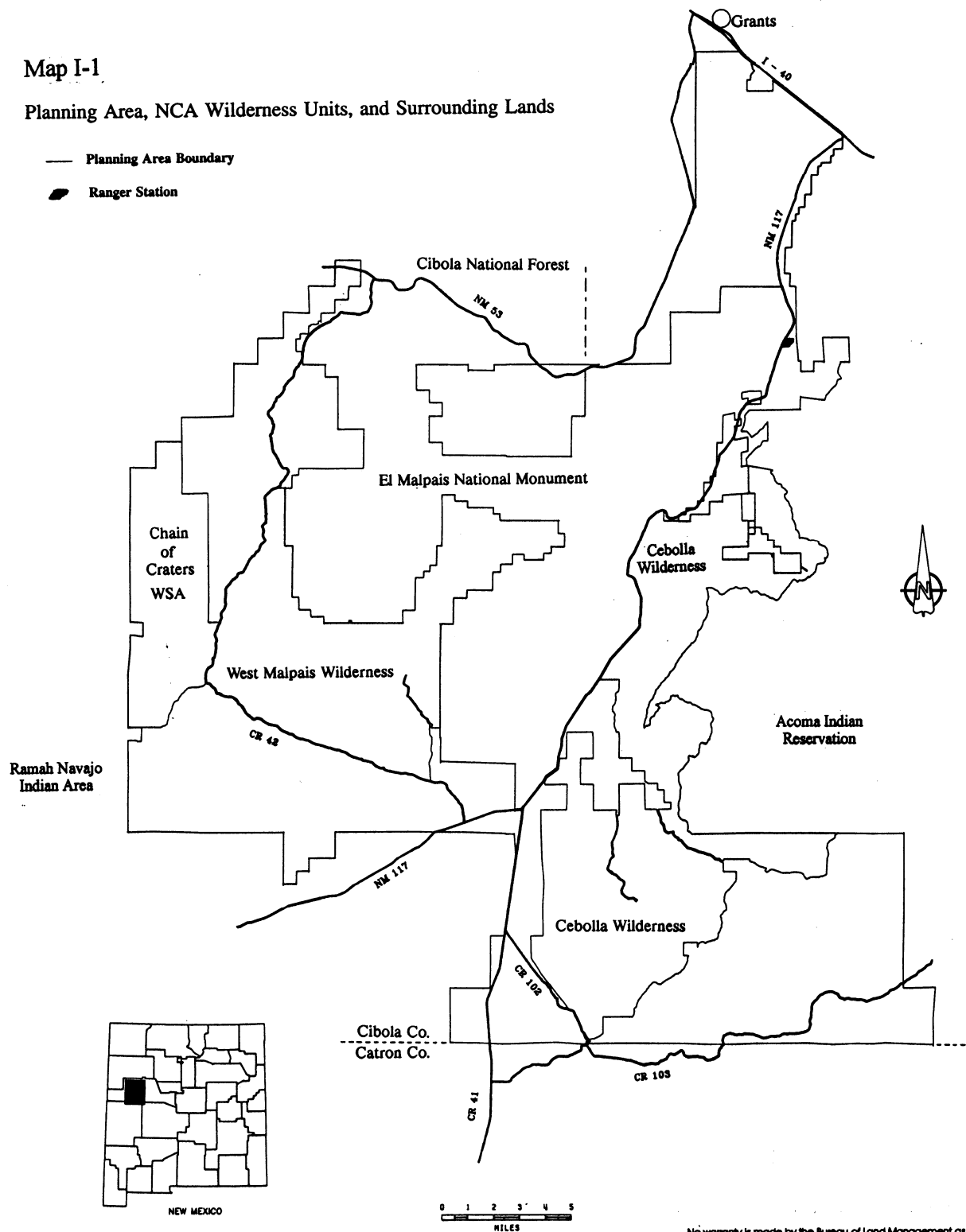
# El Malpais Planning Area

Map I-1

Planning Area, NCA Wilderness Units, and Surrounding Lands

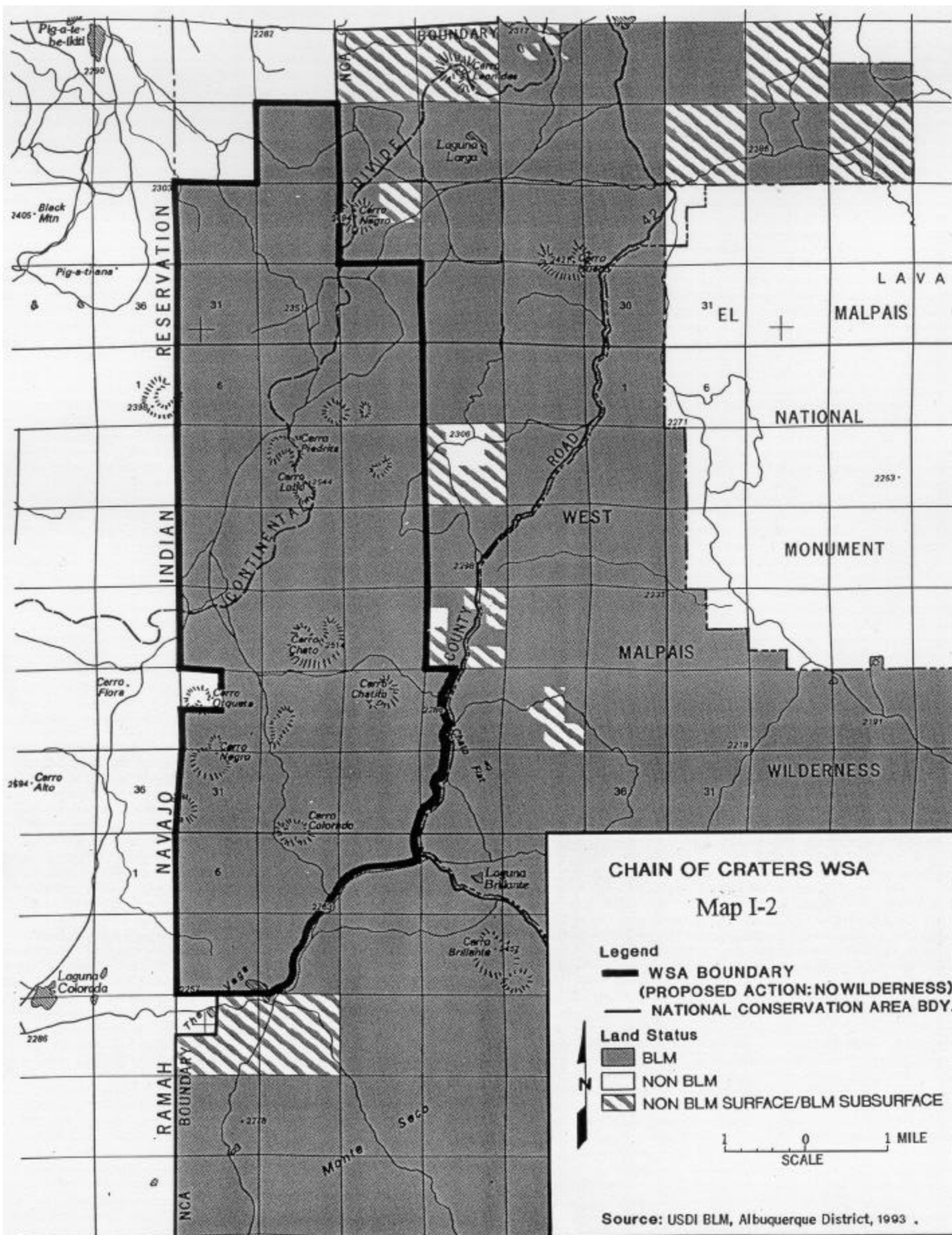
— Planning Area Boundary

● Ranger Station



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108 22'30" 15' 108 45' 107 37'30" 34 26' 35 15'





Shrubs include oak species, gooseberries, and mountain mahogany. Forbs include Indian paintbrush, pingue, creeping mahonia, and buckwheats. Small areas of open ponderosa parkland occur with a grassy understory of Arizona fescue, mountain muhly, Junegrass, and mutton bluegrass.

### **Piñon-Juniper Woodland**

Located on the lower slopes and ridges, piñon-juniper woodland ranges from 7,100 to 7,500 feet in elevation. Small patches of woodland are also scattered at higher elevations along the eastern and north-eastern slopes of the cinder cones.

This vegetative type covers about 8,300 acres, invading ponderosa pine at higher elevations. At lower elevations, this woodland invades shrublands. Slopes vary from 1 to 50 percent. Trees range in age from 1 to 30 or more years and show good growth.

Rocky Mountain junipers are common at higher elevations, while oneseed junipers become common at lower elevations. Understory grasses are typically blue grama with some bottlebrush squirreltail and mountain muhly. Common shrubs are gray horse brush, sage, snakeweed and rabbitbrush. Forbs include Indian paintbrush, locoweed, mullein, saxifrages and groundsels. About 20 percent of this area is rock outcrop.

### **Grama-Galleta Steppe**

This vegetation type includes two classes, sparse- bare and grass-shrub. Vegetation is sparse on grassy or shrubby fan terraces, flats and swales that slope gently upward into shrub-conifer. Elevations range from 7,000 to 7,500 feet with slopes of 1 to 8 percent. This type covers about 4,500 acres of the WSA.

Shrubs in this type include gray horsebrush, snakeweed, several species of sage, junipers, yucca, and *opuntia* cactus species with blue grama growing as a thin mat understory. Rabbitbrush forms nearly pure stands in some flatland areas. Lower flatlands in the southeastern portion of the WSA are predominantly blue grama or Western wheatgrass, with forbs and shrubs common.

### **Wildlife**

Several special-status plant and animal species (cinder cone phacelia, Acoma fleabane, bald eagle)

are known or have the potential to occur within the Chain of Craters. Should any special-status species on either the federal or state list be identified within the WSA, it will be protected in accordance with applicable laws and regulations.

The cinder cones, broken ridges and brushy flats form diverse wildlife habitats. This complex system provides potential habitat for over 60 species of birds, more than 20 species of small mammals, a mule deer herd, antelope, coyotes, bears, many species of reptiles, and game birds such as turkey and dove. The diverse vegetation and elevation make the WSA attractive to many migrating species of birds. The rough terrain and good cover make it likely that the WSA is visited by mountain lions.

### **Visual Resources**

The Chain of Craters WSA contains highly rated scenic values. The unit has been designated as a Class II landscape with Class A/B scenic values. Visual Resource Management (VRM) Class II designation indicates that any change in the basic landscape elements (form, line, color or texture) caused by a management activity should not be evident in the characteristic landscape.

The views from the peaks of the cinder cones are of volcanic fields, sandstone bluffs rising above the fields, and broad panoramas of open forests with Mount Taylor in the background. The open forests create variety in form and texture in the foreground.

### **Air Quality**

Air quality over the Chain of Craters is within state and federal standards. The unit has a federal designation as a Class II airshed, which allows moderate degradation of the WSA's air quality. The landscape characteristics of the Chain of Craters make alteration of the airshed apparent.

### **Cultural Resources**

Archeological survey in the Chain of Craters is limited to a 10 percent sampling of eight sections, amounting to a total of 581 acres of Class III inventory. No cultural resource sites and few isolated artifacts were found in this survey, suggesting that cultural resources are minimal.

Reconnaissance in the WSA has revealed three historical sites. A homestead consisting of two par-

tially standing cabins, a barn, a cellar, and assorted materials is located close to the eastern boundary. A camp with two standing cabins and sawmill remains are located near the northern boundary. A large shrub meadow close to the northwest boundary contains subtle evidence of a logging camp.

At least three American Indian tribes (Acoma, Zuni, and Navajo) have close ties to the Chain of Craters. All three claim it as part of the area they used before European settlement, and current boundaries find the Chain of Craters adjacent to Ramah Navajo Indian lands on the west.

Recognizing that American Indians have used the NCA in the past, P.L. 100-225 guarantees them access for traditional cultural and religious purposes (consistent with the American Indian Religious Freedom Act and the Wilderness Act). P.L. 100-225 further provides that specific portions of the NCA can be temporarily closed to protect privacy for traditional activities.

### **Mineral Development**

No mineral resources have been developed with in the Chain of Craters WSA, and no mining claims or federal leases exist. With passage of P.L. 100-225, all federal minerals in the NCA were withdrawn from entry and development. The private subsurface in the Chain of Craters (approximately 8,960 acres) has been acquired and withdrawn from mineral entry.

### **Livestock Grazing**

Portions of two BLM grazing allotments lie within the boundaries of the Chain of Craters, each containing range improvements (refer to Maps I-3 and I-4). Since P.L. 100-225 established the WSA, the Cerro Chato and Los Cerros Allotments have been combined to form one allotment called Los Cerros, which covers the WSA's northern portion.

Total dry herbage production ranges from 500 pounds per acre in poor years up to 1,200 pounds per acre in favorable years. Stocking rates range from 5 to 10 acres per animal unit month. The unit is poorly suited for yearlong grazing due to high elevation and potentially severe winter weather.

The northern portion of the WSA contains approximately 39 percent of the Los Cerros grazing

allotment. The current grazing level is approximately seven head per section per year. Range improvements include approximately 21.5 miles of barbed wire fence line, 17 dirt tanks, 16 water troughs, 9 miles of buried water pipeline, two water wellheads and three 10,000-gallon water storage tanks.

The water well in the Los Cerros Allotment was drilled in 1981 to provide livestock water. Because the well did not exist before passage of the Federal Land Policy and Management Act (October 21, 1976), it cannot be considered as part of a "grandfathered" grazing operation and is therefore a temporary improvement. In accordance with the *Interim Management Policy for Lands Under Wilderness Review*, if the Chain of Craters was designated as wilderness, the well would have to be abandoned, equipment removed, and the area restored.

The southern end of the WSA contains about 12 percent of the Cerro Brillante Allotment. The current grazing use level for this allotment is approximately seven head per section per year. Range improvements include about 3.5 miles of fence line and a dirt tank.

### **Timber Production**

Records of logging in the Chain of Craters date from 1948 through 1975. During this period, 22 sale contracts were awarded for the harvest of 6,353 million board feet of timber within several sections of the WSA. The lands covered in these contracts were: T. 7 N., R. 13 W., Sections 4, 5, 6, 18, 19, 20, 21, 29, 30; and T. 8 N., R. 13 W., Sections 12 and 20. Associated with the harvest of timber, a right-of-way (Serial No. NM 0184210) for a timber access road was acquired in September of 1960 through private lands that existed in the WSA at that time. However, designation of the Chain of Craters as part of the NCA in 1987 retired commercial timber production.



### **Recreation**

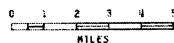
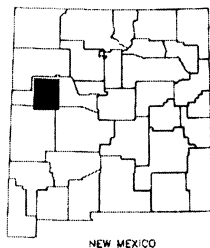
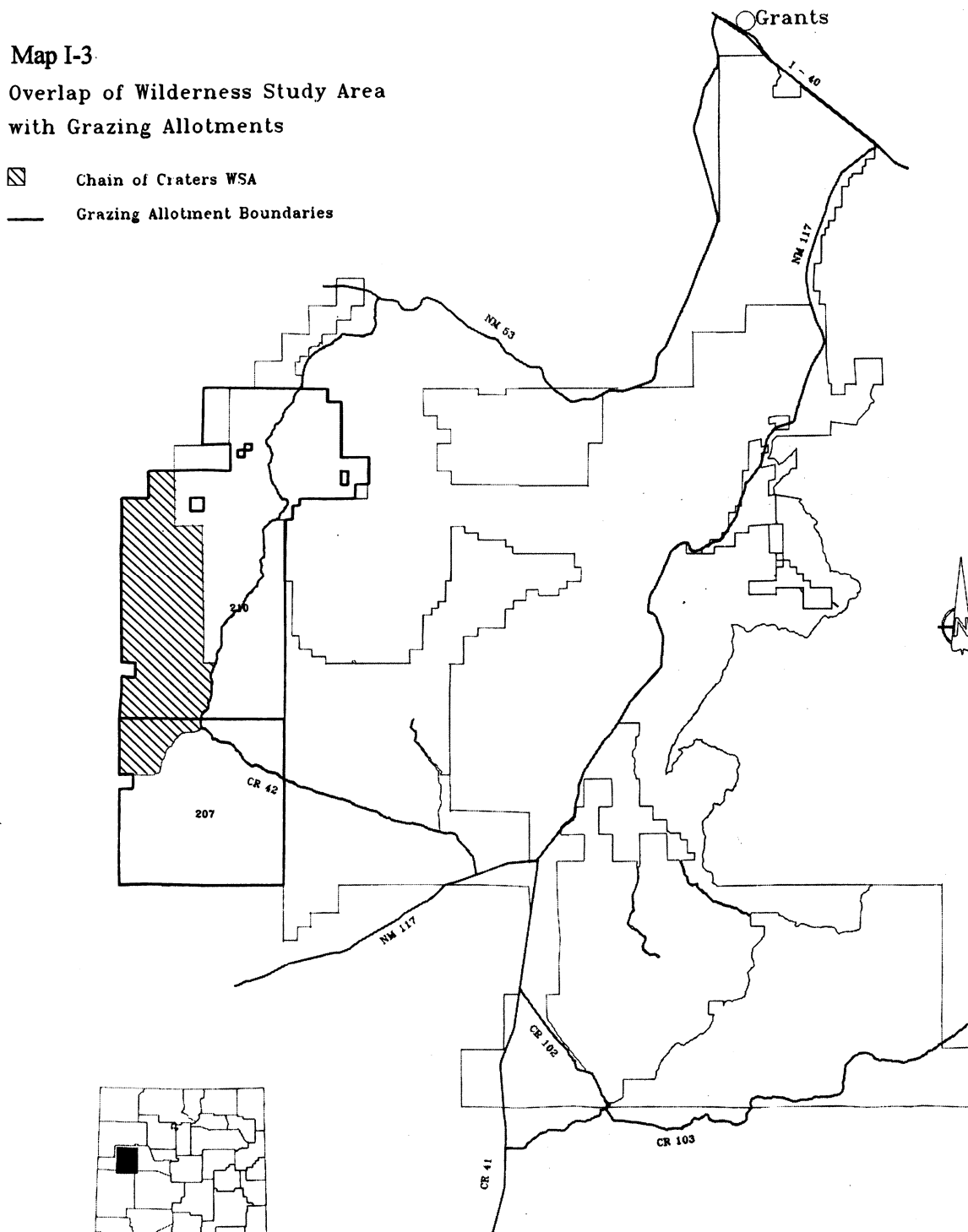
The most current BLM Recreation Opportunity Spectrum (ROS) inventory (USDI, BLM, 1996) has classified the WSA as roaded natural, semi-primitive motorized, and semi-primitive nonmotorized (refer to Map I-5). The area that borders CR 42 is considered roaded natural because the road is maintained by the county. However, the condition of CR 42 limits accessibility during wet weather.

# El Malpais Planning Area

Map I-3

Overlap of Wilderness Study Area  
with Grazing Allotments

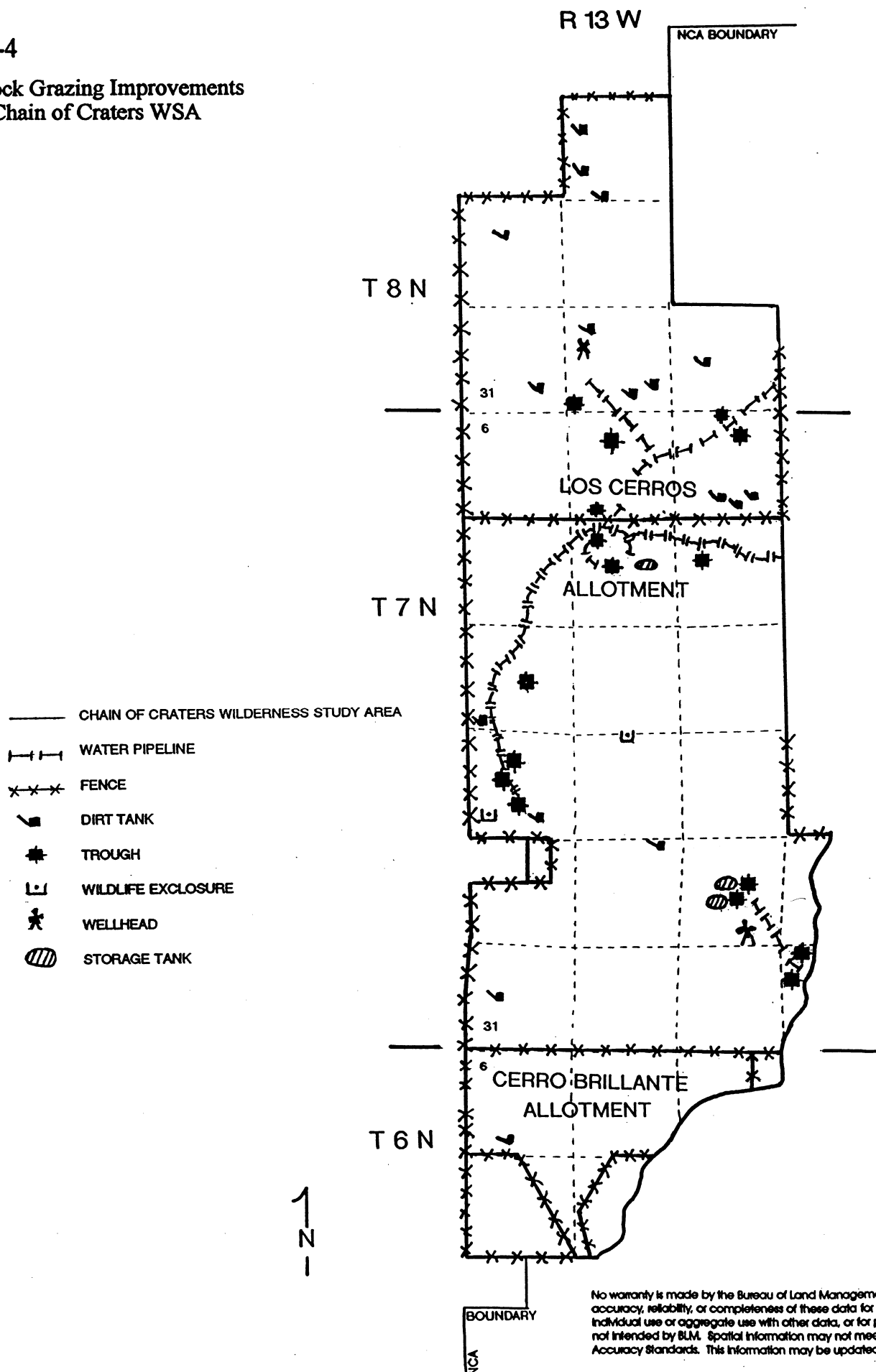
-  Chain of Craters WSA
-  Grazing Allotment Boundaries



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# Map I-4

## Livestock Grazing Improvements in the Chain of Craters WSA



The WSA offers high potential for recreational use. Suitable activities include sightseeing, day hiking, mountain biking along old vehicle routes, backpacking, camping, semi-primitive motorized touring, and horseback riding. Opportunities exist for bird-watching, landscape and nature photography, and observation of geologic features.

The amount of recreation use in the Chain of Craters has not been quantified. Hunting is known to take place; in recent years BLM employees have encountered deer hunters during patrols. Other activities observed by BLM personnel are camping, hiking, mountain biking, and back-country driving (off-highway vehicle use). A corridor for the Continental Divide National Scenic Trail has been selected and passes through the Chain of Craters (USDA, FS 1993; refer to Map I-6).

### **Access & Transportation**

The BLM's *Rio Puerco Resource Management Plan* (RMP; USDI, BLM 1986) limited motor vehicle use in the Chain of Craters to existing ways and trails. Approximately 35 miles of ways were inventoried and mapped in the RMP. More intensive road inventories conducted since 1986 now show 46.5 miles of travel routes (USDI, BLM, 1996). Some routes identified in the earlier inventory as abandoned or showing signs of little use now show evidence of renewed use. This use is the result of increased back-country recreational driving, livestock management and facility maintenance.

### **Wildlife Habitat**

Two wildlife exclosures lie within the Chain of Craters, both in T. 7 N., R. 13 W. One exclosure in Section 17 is located in ponderosa parkland between two cinder cones. This exclosure contains an inverted umbrella water collection device. The other exclosure in Section 19 is located in a rabbitbrush flat.

The WSA was included in the BLM's *El Malpais Habitat Management Plan* (USDI, BLM 1981), which proposed 28 wildlife projects in what is now the Chain of Craters WSA. Projects included exclosures, waters, and habitat alteration.

### **Geologic Research**

The Chain of Craters offers an excellent opportunity for observing and studying volcanic features and processes. Geologic research conducted in the past includes geochemical and isotopic studies (e.g., Laughlin, et al. 1982; Causey 1971).

### **American Indian Uses**

The Chain of Craters is a cultural landscape, used by local American Indian groups to define and perpetuate their culture and traditions. Besides subsistence and economic uses and explicitly religious activities, the importance of the WSA is primarily tied to the sacredness of nature. Even though Indian people believe land resources are there to be used, they believe any use should be accompanied by reverence for the spiritual power in the landscape.

Although all of El Malpais and the universe have this sacred power, certain points are more important because they are mentioned in origin stories, serve as symbols for events in mythological time, or are places where spiritual beings can be contacted. General categories of important places to Navajo people include those in mythology, places of spiritual danger, shrines, and gathering areas. Important places to Pueblo people include those related to mythology, boundary points, shrines, ancestral villages, pilgrimage trails, and gathering areas.

Examples of most of these general categories are believed to be present in the WSA. Major Zuni shrines are located a short distance to the north and Acoma boundary shrines are found to the north, west, and south of the WSA.

The Ramah Navajos have expressed strong concerns about the Chain of Craters. Many Navajo religious shrines are believed to be present in the WSA, as are specific areas where plants, birds, minerals and other natural resources are gathered for use in ceremonies. Also, in more generalized areas Navajos hunt, gather dye materials, and pick nuts.

However, Pueblo and Navajo people are reluctant to divulge the location of sacred places or discuss traditional cultural and religious practices in any detail. Therefore, many specific places and practices pertaining to the Chain of Craters are omitted in this

discussion, and continued consultation and coordination with the concerned American Indian groups is imperative.

### **Cultural Resources**

No cultural resources are being actively managed in the Chain of Craters WSA. Surveys conducted in the WSA during the summer of 1989 indicated that cultural resources are very sparse.

## **WILDERNESS CRITERIA**

### **Quality of Mandatory Wilderness Characteristics**

The quality of mandatory wilderness characteristics of the Chain of Craters WSA has been documented in discussions for the development of P.L. 100-225. The following paragraphs elaborate on these characteristics.

#### **Size**

The area meets the size requirements of the 1964 Wilderness Act, "... at least 5,000 acres," as it contains 18,300 acres. The area is slightly over 3 miles wide at its widest point and approximately 11 miles in length at its longest point. The WSA is bounded on the west by the Ramah Navajo Indian lands, on the south by roads, on the north/northeast by private lands and roaded public lands (refer to Map I-1). One mile of a powerline right-of-way also helps form the boundary on the east side in Section 16, T. 7 N., R. 13 W. A 30-foot-wide right-of-way (Serial No. NMNM 76793) originally issued by the State of New Mexico in 1977 to the Continental Divide Electric Coop was acquired by the BLM as part of state land exchanges in 1988.

#### **Naturalness**

A detailed description of the human imprints in the Chain of Craters WSA is contained in the Wilderness Intensive Inventory (USDI, BLM 1988b), on file at the BLM Albuquerque Field Office. When assessing naturalness, the BLM must consider the overall impacts of such imprints on the entire unit.

In the Chain of Craters WSA, impacts include 21.5 miles of fenceline, 17 dirt tanks, a water well with a motorized pump, a capped wellhead, 9 miles of buried water pipeline, three 10,000-gallon above

ground water storage tanks, 16 metal water troughs linked to the pipeline, three small historical dump sites (which could be removed using hand tools), 46.5 miles of vehicular routes, and two wildlife exclosures. These human imprints are scattered throughout the area.

P.L. 100-225 allowed for the continuation of grazing in the NCA, including the Chain of Craters. Should the area be designated wilderness, grazing and the appropriate use of motorized and mechanized equipment would still be allowed.

Past logging activity has left evidence of timber access routes, downed logs, and stumps. These stumps are dispersed throughout a range of maturity levels of mixed conifer and ponderosa pine. Some old slash piles can also be seen.

Many vehicular ways are evident throughout the WSA. Some appear to be abandoned and are difficult to trace in places, while others are very noticeable and are maintained by continuous use. A 1996 inventory mapped 46.5 miles of vehicle routes in the WSA (refer to Map I-7). With the existing density of vehicle routes, it is difficult to get more than ½ mile from any evidence of a vehicle route.

The berms around the dirt tanks are vegetated like the rabbitbrush meadows they stand in. These tanks are small and hold less than 10 acre-feet of water.

One wildlife exclosure is located in ponderosa parkland and contains a wildlife water catchment shielded by vegetative cover. The second exclosure is located in rabbitbrush flats edged by mixed conifer woodland, and blends in with its surroundings.

The WSA as a whole appears natural and is considered to exhibit the wilderness characteristic of naturalness. Vegetation and topography screen human impacts, contributing to the naturalness.




#### **Solitude**

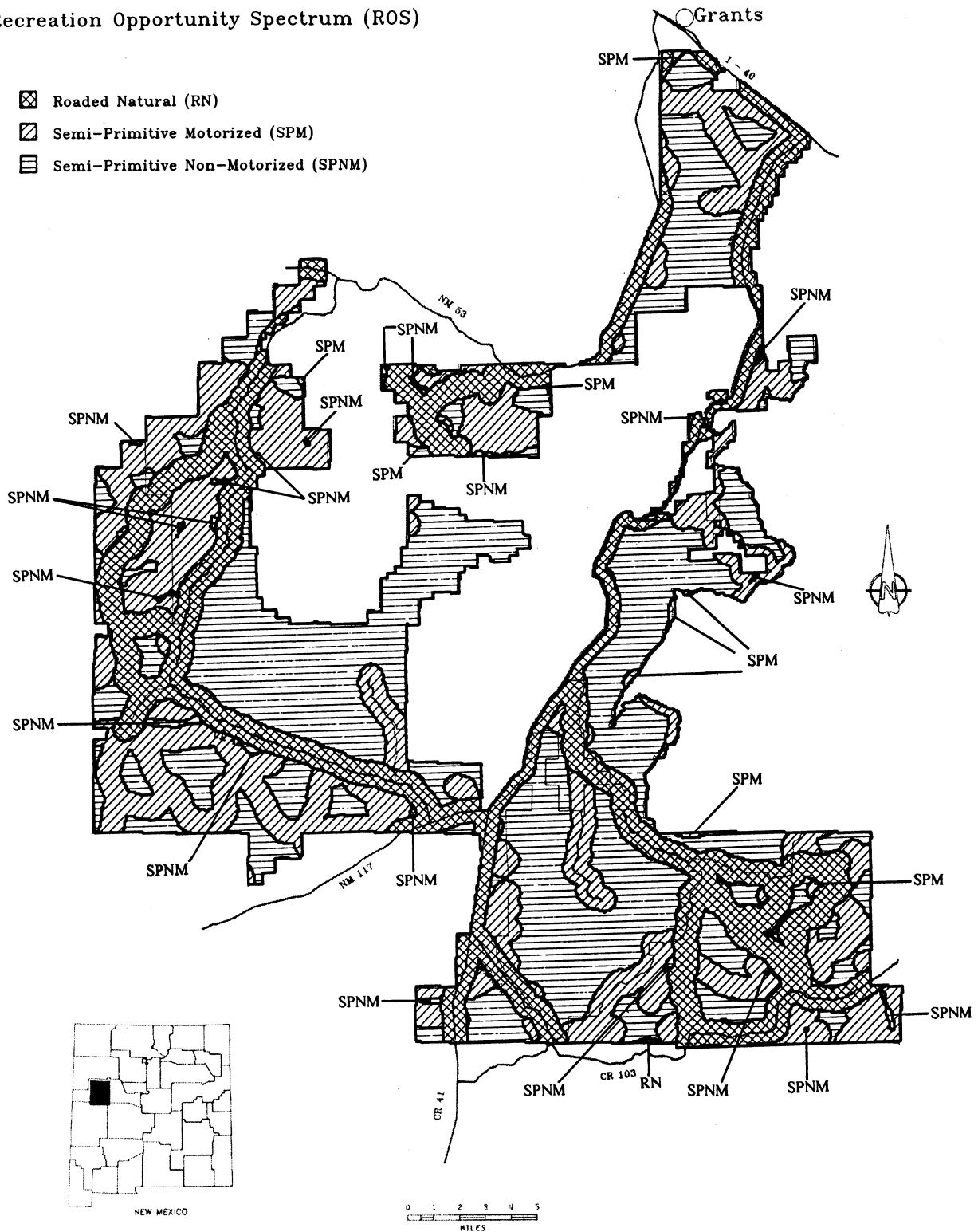
The volcanic terrain and vegetation combine to create screening that provides an opportunity for individuals or groups to find secluded places for solitude. However, the configuration of the WSA, density of the vehicle routes, and the continuous need to maintain range improvements affect the opportunity to find isolated locations for solitude.

# El Malpais Planning Area

## Map I-5

### Recreation Opportunity Spectrum (ROS)

-  Roaded Natural (RN)
-  Semi-Primitive Motorized (SPM)
-  Semi-Primitive Non-Motorized (SPNM)



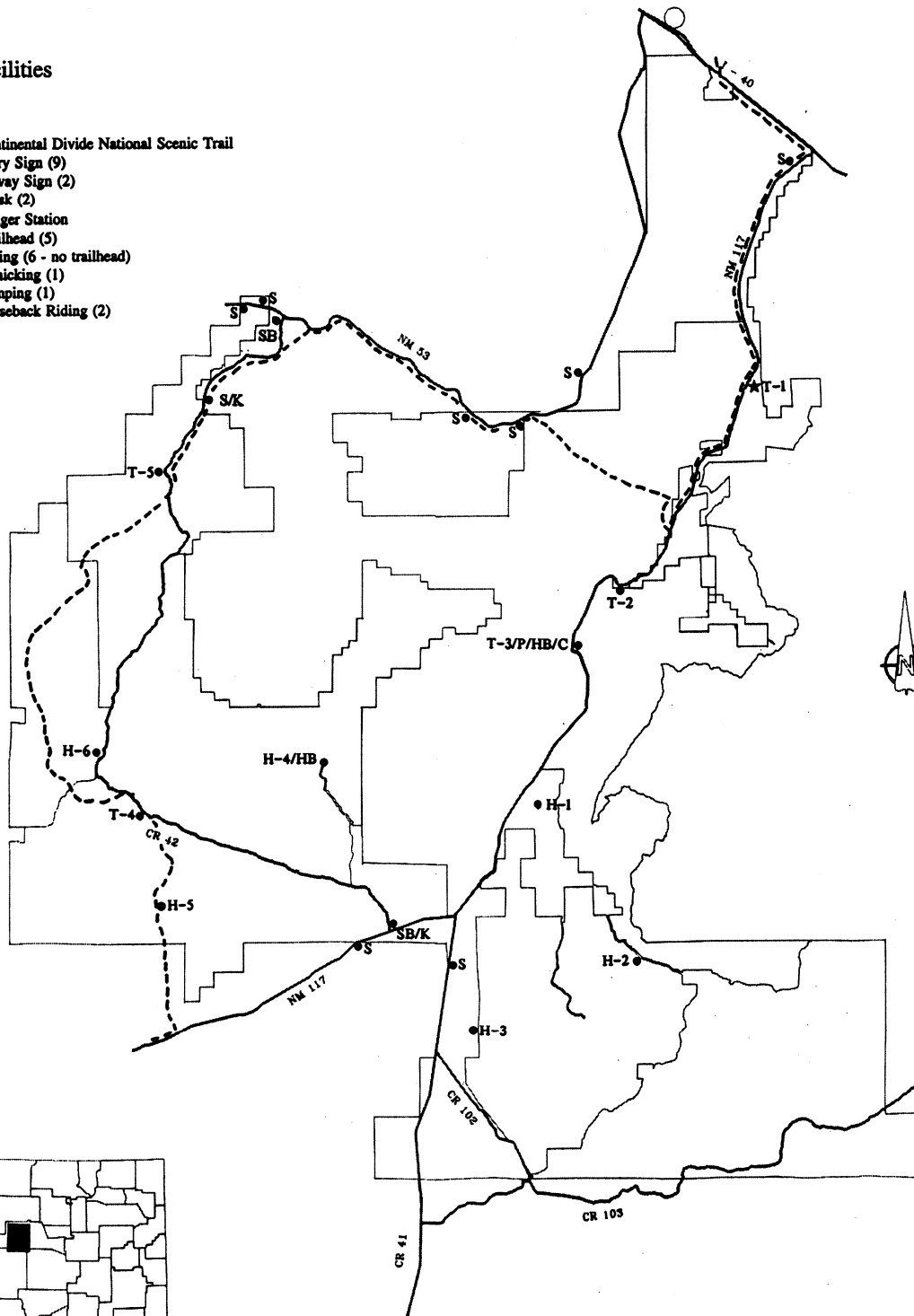
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# El Malpais Planning Area

## Map I-6

### Recreation Facilities

- Continental Divide National Scenic Trail
- S Entry Sign (9)
- SB Byway Sign (2)
- K Kiosk (2)
- ★ Ranger Station
- T Trailhead (5)
- H Hiking (6 - no trailhead)
- P Picnicking (1)
- C Camping (1)
- HB Horseback Riding (2)



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### **Opportunities for Primitive & Unconfined Recreation**

The BLM defines this wilderness characteristic as the potential for a WSA to provide opportunities for diverse activities that are not dependent on motorized vehicles. The terrain and vegetative features of the Chain of Craters WSA lend themselves to sight-seeing, day hiking, nature photography, bird-watching, backpacking, camping and horseback riding. The WSA provides an outstanding opportunity for primitive recreation.

### **Special Features**

The Chain of Craters is part of a large volcanic field in west-central New Mexico. The complex terrain and vegetation offer a variety of habitats for many species of wildlife including deer, bears, raptors and possibly mountain lions. The unit may occasionally be used as wintering ground by bald eagles. Several historical homesteads are located within.

### **Multiple Resource Benefits**

The Chain of Craters contains many natural resources. Congressional designation of the area as wilderness would carry the weight of law and provide long-term protection. Through P.L. 100-225 the area is withdrawn from all forms of entry, appropriation, or disposal under public land laws; location, entry and patent under mining laws; and operation of mineral/geothermal leasing laws and all amendments.

No valid existing mineral rights are known within the Chain of Craters. The NCA is also closed to the collection of green or dead wood for sale or other commercial purposes.

### **Ecotypes Present**

The vegetative-ecosystem classification for the Chain of Craters WSA is as follows (after Kuchler 1964; Bailey 1976).

#### **Dry Domain**

##### **Highland Province**

##### **Colorado Plateau Subprovince**

##### **Ponderosa pine**

- 5,500 acres (30 percent)

##### **Piñon-juniper woodland**

- 8,300 acres (45 percent)

##### **Grama-galleta steppe**

- 4,500 acres (25 percent)

### **Distance from Major Population Centers**

The Chain of Craters is within a 1-hour drive of Grants, New Mexico and within 5 hours of Bernalillo and Sandoval Counties. In the 1980 census, parts of these two counties were included in a Standard Metropolitan Area (USDC, BC 1982). The unit is within 3 hours of Albuquerque and 4 hours of Santa Fe, two of the largest population centers in New Mexico.

The WSA is within a day's drive of several designated wildernesses, as shown on Map I-8. The western boundary of the West Malpais Wilderness for over 2 miles is separated from the Chain of Craters by CR 42 (refer to Map I-1). The BLM's other wilderness within the NCA, the Cebolla, is located approximately 14 miles to the east. The western boundary of the El Malpais National Monument is located 3 miles to the east of the WSA. Most of the National Monument (86,267 acres) has been identified as suitable for wilderness (USDI, NPS 1990a). Several other WSAs within a day's driving time of the Chain of Craters and the El Malpais National Monument have been found suitable for wilderness preservation.

### **MANAGEABILITY**

To be recommended for designation, the Chain of Craters WSA must be capable of being effectively managed as wilderness. In determining manageability, the BLM must consider such factors as private and state inholdings, valid existing rights, mineral leases, rights-of-way, and the overall land ownership pattern.

No private surface inholdings, mineral leases, claims, or rights-of-way exist in the WSA. As of March 29, 1995, all private subsurface rights have been acquired.

The two grazing allotments that encompass the unit are not considered to be incompatible with wilderness management. However, continued maintenance of range improvements will result in the extended use of certain existing vehicle routes.

Because of use by local American Indians and the nature of Navajo religious practices, the BLM cannot effectively administer the Chain of Craters as wilderness without serious conflicts. Wilderness designation is perceived by American Indians in the

area as causing significant hardships for them in carrying out traditional ceremonies, which are not confined to specific locations, times of year, or designated individuals.

P.L. 100-225 allows for nonexclusive access by Indian people for traditional and religious purposes as long as it is consistent with the intent of the Wilderness Act. Subject to certain exceptions, the Wilderness Act prohibits the use of motor vehicles and motorized equipment. Under these circumstances, it would be extremely difficult to prescribe an administrative procedure to allow vehicular access for traditional purposes without being in violation of the Wilderness Act. Special legislative provisions for this area would be required.

Also, land ownership along the boundaries (Ramah Navajo on the west, and private owners on the north and east) may present management problems. The possibility of trespass onto private or tribal land by wilderness users exists, although this threat might occur regardless of wilderness designation. The proximity of the subdivided quarter-section to the north could intrude on the unit's visual qualities if development takes place.

## **PUBLIC INVOLVEMENT**

Since 1981, BLM activities have focused public attention on the Chain of Craters. The number of people expressing interest has been small, but they have been vocal in their support and opposition. Between 1981 and 1991, the drafts of four Chain of Craters documents were sent to the public for review and comment concerning WSA use and management. During this same period two El Malpais update letters were sent to persons on the Rio Puerco Resource Area mailing list requesting comments, and several editions of the El Malpais Update Newsletter were mailed to the public for input. Meetings were held to discuss the NCA, including the WSA.

Public meetings were held in Grants and Albuquerque in June 1988, and in Ramah in August 1988. At these meetings, 13 comments were received regarding the Chain of Craters' designation as wilderness. Five of these inputs expressed support for wilderness designation. Reasons cited were the potential wildlife benefits and the untrammelled naturalness of the WSA. Three inputs were apprehensive about grazing having an impact on the wilderness charac-

teristics of the WSA. Seven comments reflect a concern that wilderness designation would negatively impact ranching operations. Ten inputs indicated that wilderness designation would make collecting vegetative material for traditional uses difficult for local American Indians.

Additional public meetings were held in Albuquerque and Grants in December of 1988, and Acomita and Ramah in January of 1989 to discuss alternative ways of managing the Chain of Craters. Public input received in response to these meetings and the newsletter mailing included 17 comments that wilderness designation would negatively impact existing ranching activities. Fourteen comments expressed concern that the diversity of wildlife habitats in the Chain of Craters should be maintained. Twenty-two comments reflected the view that wilderness designation for the Chain of Craters would negatively impact access for older American Indians to conduct traditional practices or collect vegetative materials. Eighteen comments favored closing specified vehicle routes inside the WSA boundaries. Thirty-two comments expressed concern that the large adult piñons be protected, while 10 comments expressed concern that more fires could occur because woodcutting would be limited.

On January 13, 1989, the Ramah Navajo Chapter passed a resolution affirming that the entire El Malpais is very sacred to them. The resolution states that it is important to the chapter that development be restricted and privacy be ensured for traditional practices. It also states their need for "unlimited and unrestricted access to the El Malpais to gather plants, native foods, medicines and salt required for traditional purposes, to make sacred offerings, and to carry out other traditional cultural practices and uses."

In April, 1990, open houses were held in Grants and Albuquerque to gather public input on the Draft El Malpais General Management Plan (GMP) and Environmental Assessment. Formal hearings were also held to take testimony on Chain of Craters wilderness suitability. Attendance at the open houses and hearings is shown in Table I-1.

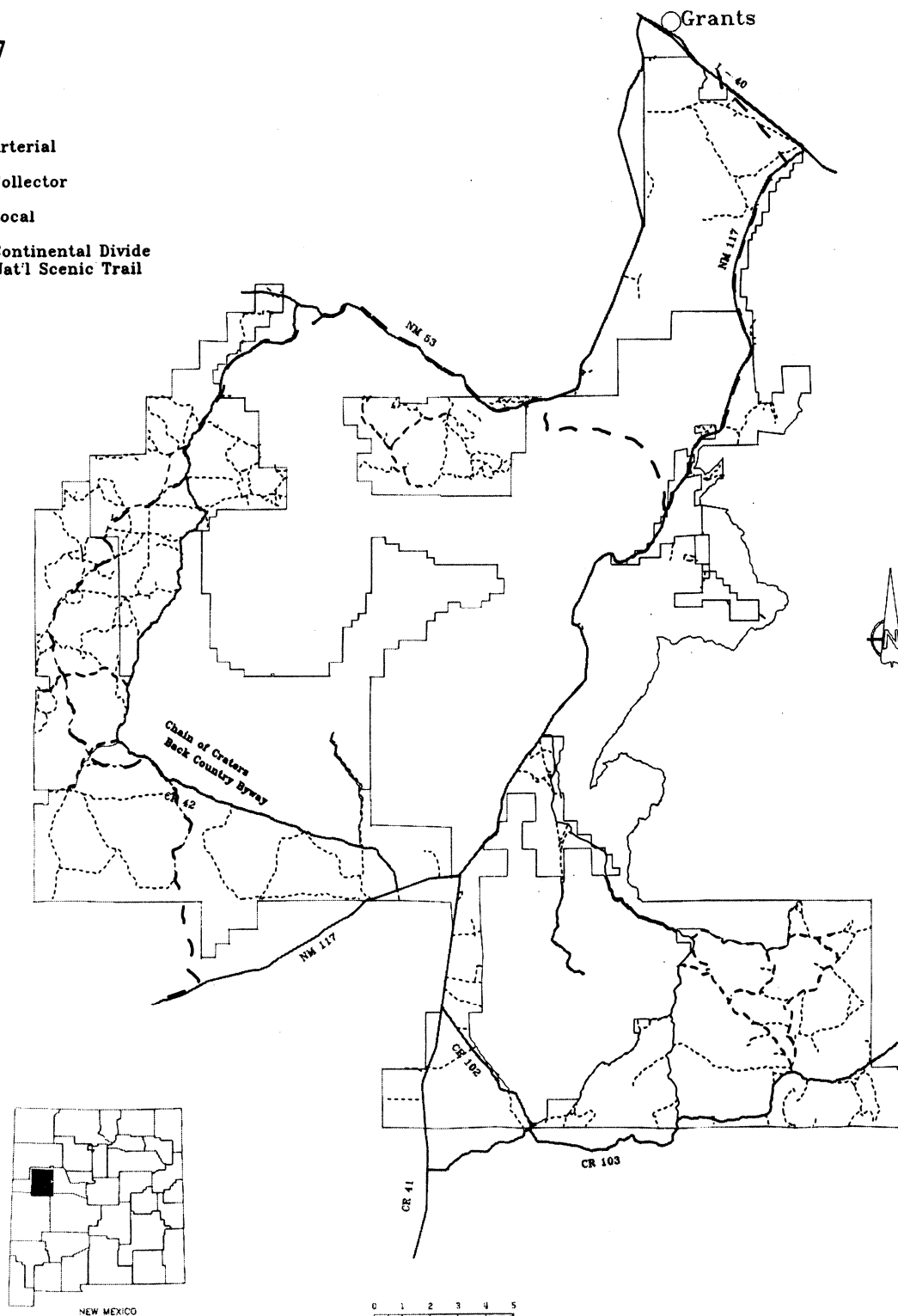
The hearing transcripts are on file at the Albuquerque Field Office. Portions of the Draft and Final GMPs (the latter released in January 1991) with accompanying BLM responses are printed in the Chain of Craters Wilderness Analysis Report/EA

# El Malpais Planning Area

## Map I-7

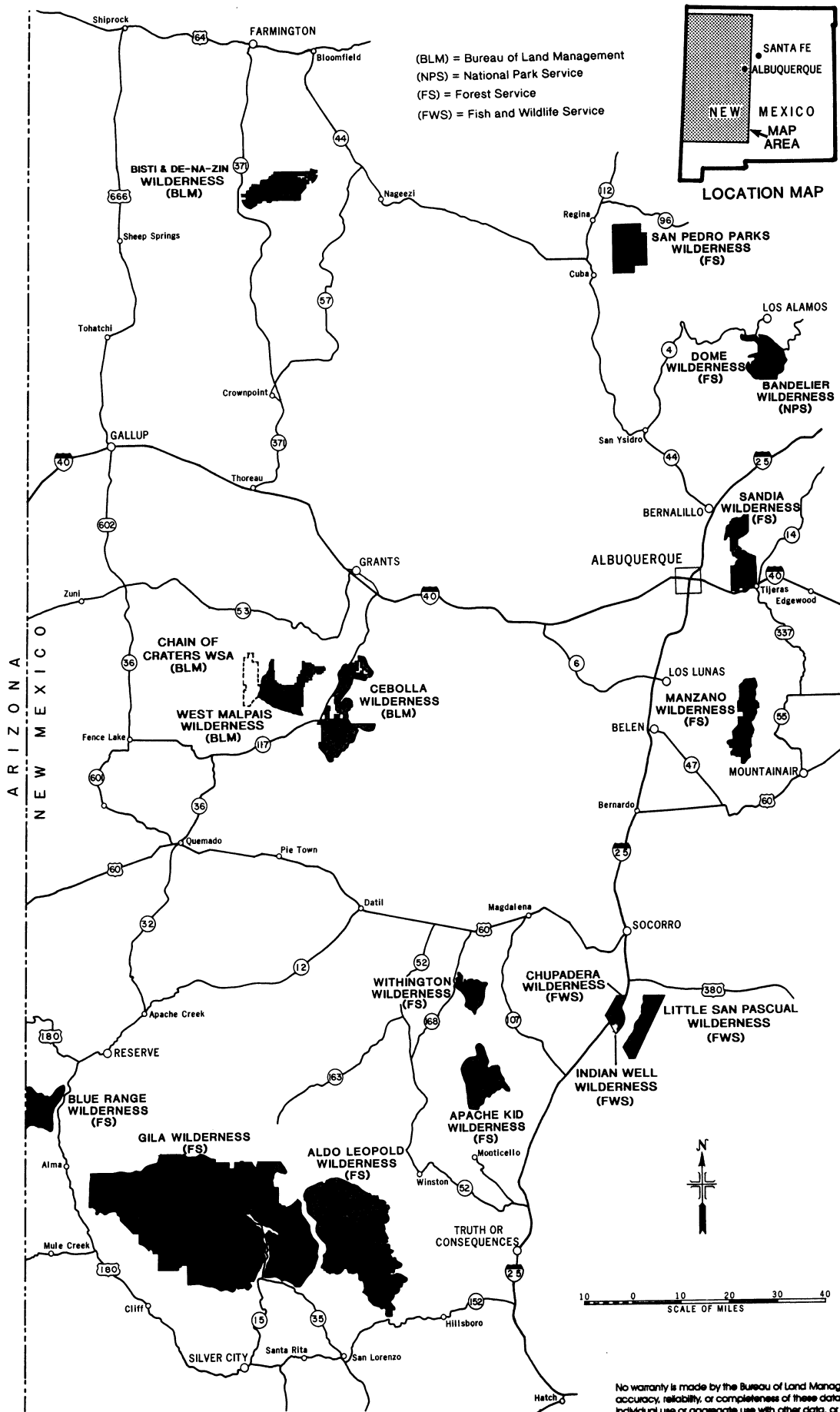
### Roads

- Arterial
- - - Collector
- ..... Local
- - - Continental Divide Nat'l Scenic Trail



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# Map I-8 Wilderness in Western New Mexico



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TABLE I-1

**ATTENDANCE AT CHAIN OF CRATERS  
WILDERNESS MEETINGS**

<b>Location</b>	<b>Date</b>	<b>Attendance-- Open House</b>	<b>Attendance-- Hearing</b>	<b>Number Testifying</b>
Grants	4/18/90	53	3	2
Albuquerque	4/19/90	44	6	5

(July 1991). In the final GMP, the No Wilderness Alternative was selected as the proposed action for the WSA.

Comments both opposing and favoring wilderness designation were received. Both groups share a concern for maintaining the integrity of the area's resource values, but differ in how to accomplish this goal.

Proponents of wilderness designation cite the WSA's natural character and its setting within the NCA. The Chain of Craters is contiguous with the western boundary of the West Malpais Wilderness, a fact that leads some to support wilderness designation. Some comment that the area is inappropriate for non-wilderness-related recreation activities such as mountain biking. Also it was expressed that significant reasoning was not presented to justify a no wilderness designation, and that a compromise could be worked out with the Ramah Navajos on access to sacred sites.

Opponents of wilderness designation cite possible limitations on ranch operations, and restrictions on access for traditional American Indian practices. The existence of other designated wilderness with the NCA boundaries has raised concerns by some recreationists that additional nonwilderness recreational opportunities would be lost.

The *Federal Register* of March 31, 1992, contained the Revised Implementing Procedures for the National Environmental Policy Act. This revision identified proposals for wilderness as a major action normally requiring an EIS. As a result, the BLM determined that an EIS should be prepared for the Chain of Craters WSA. The BLM announced its intention to prepare an EIS in a Notice of Intent published in the *Federal Register* on October 21, 1993

(Vol. 58, No. 202, p. 54369). This notice announced a 30-day public scoping period. The release of the Draft EIS was preempted by an April 1994, Interior Board of Land Appeals (IBLA) decision on the approval of the 1990-91 GMP/EA for the NCA. The IBLA directed the BLM to prepare an RMP/EIS for the entire NCA (including the Chain of Craters).

Comments received during the 1993 EIS public scoping period centered around the following issues:

**Supporting Wilderness**

- The area should be permanent wilderness because of its naturalness.
- The sense of isolation exists.
- Visits are a unique and special experience.
- Use for research and study of evolutionary adaptations, protect melanistic species.
- The wilderness system lacks grassland representation; Chain of Craters will help fill this gap.
- The area has high-quality natural and scenic values.
- The main objections to wilderness are raised by Ramahs and ranchers, but accommodations can meet these.
- Consider a full range of alternatives.
- The Draft EIS should examine the potential for developing the National Monument and the NCA, including paving CR 42 and the potential recreational use of the Chain of Craters.
- Show data on grazing uses, including species composition, production, and utilization.
- The 1991 EA mentions seasonal American bald eagle use.
- Show plans for roads.
- An NCA EIS should be done first to look at the big picture.

### **Opposing Wilderness**

- How will senior and disabled citizens see the land if vehicle traffic is restricted?
- Six comments simply said "No Wilderness."
- Wilderness creates a burden on the ranchers. Pipeline and fence maintenance would require a full-time person with hand tools. Worker safety could be a problem with only horseback access.

### **American Indian Issues**

- The WSA is within an aboriginal land claim area.
- Shrines and landmarks are located along the Chain of Craters.
- American Indians have land use rights to shrines and natural resources such as forests, plants and minerals for traditional purposes.
- American Indians require vehicular access because of time and distance.
- Indians oppose wilderness because it denies efficient and timely access and is too restrictive.
- This is one of the holiest areas, with American Indian ties going back to creation.

- Protect the area as sacred, with unrestricted American Indian access and privacy for respectful traditional use.
- Proper management of this sacred living landscape should require consideration of an American Indian Wilderness.
- Give priority to nondestructive American Indian uses.
- There is a big difference between what the BLM considers cooperation with American Indians and what the Indians themselves consider cooperation from agencies regarding protection of religious and cultural rights.
- We do not believe it is fact that Ramah Navajos oppose wilderness designation.
- Has the BLM met with American Indians regarding vehicular access to any areas within the NCA?
- An all-wilderness alternative with full American Indian rights should be drawn up in consultation with these groups.

These comments have been considered in the preparation of this Plan Amendment/EIS.

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WILDERNESS INVENTORY OF LANDS  
CONTIGUOUS TO THE CEBOLLA WILDERNESS

APPENDIX J

## APPENDIX J

# WILDERNESS INVENTORY OF LANDS CONTIGUOUS TO THE CEBOLLA WILDERNESS

(October 1995)

### INTRODUCTION

In determining if public lands possess wilderness values, the BLM conducts inventories using the criteria found in BLM guidance and given by the Congress in the Wilderness Act of 1964. If the agency concludes that the inventoried lands possess wilderness characteristics, it then conducts a study (through the planning process, with public participation) on the area's suitability or unsuitability for preservation.

### BACKGROUND

Inventories of roadless public lands now included in the southern portion of the Cebolla Wilderness were conducted under Section 603 of the Federal Land Policy and Management Act of 1976 (FLPMA). Since designation of the Cebolla Wilderness in December 1987, the BLM has acquired approximately 8,200 acres of private lands contiguous to the wilderness. With acquisition of these lands, another 2,180 acres of public lands not previously inventoried are now being considered for wilderness preservation. These lands were not previously considered because they were not of sufficient size, were bounded by roads, and were isolated parcels at the time of the Section 603 inventory. The 10,380 acres of contiguous public land covered by this inventory are shown on Map J.

The following documentation of human imprints is based on existing information and field inventories of the contiguous lands. Field reconnaissance to record location, size and description of these imprints and determine the impacts on overall naturalness was conducted in September 1995 by BLM staff members.

A vehicle travel route inventory was also conducted during the summer and fall of 1995 in the National Conservation Area (NCA), including the contiguous lands. (Note: The mileage listed in this report has been rounded to the nearest tenth of a mile. It was generated either by driving the route or calculating the distance by measuring the route as drawn

on the inventory maps.)

The contiguous lands are being used primarily for grazing, recreation and wildlife habitat. The 62,000-acre Cebolla Wilderness is considered predominantly natural, although it has been influenced by such historical human use as agriculture, fuelwood gathering, and grazing. More recent additional use includes scientific research and dispersed recreation. The wilderness contains nationally significant archeological sites in extremely high density. A number of historical homestead-era sites can also be found there.

### WILDERNESS CHARACTERISTICS

#### Size

##### Criteria for Size

The size criteria can be satisfied if an area has at least 5,000 acres of contiguous roadless public land, or is sufficiently large that its preservation and use in an unimpaired condition is practicable. An area less than 5,000 acres in size must possess naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and be contiguous with a designated wilderness or roadless area of sufficient size to make practicable its preservation as wilderness.

##### Evaluation of Present Situation

The 10,380 acres of inventoried lands are contiguous to the Cebolla Wilderness along its boundaries. They are located between the wilderness boundary, highways, or bladed roads and other appropriate boundaries.

##### Conclusion

The lands are contiguous to and a natural extension of the Cebolla Wilderness. Adjustments through inclusion of additional lands will allow for the wilderness boundary to be relocated to more identifiable



locations on the ground, and a more extensive area supporting wilderness characteristics. Additional acreage will allow visitors more opportunities to experience isolation or participate in primitive recreational activities over a larger area in which the imprint of human work is substantially unnoticeable.

## **Naturalness**

### **Criteria for Naturalness**

A wilderness “generally appears to have been affected by the forces of nature, with the imprint of man's work substantially unnoticeable.” Areas in which the imprint of human work is substantially noticeable, but that otherwise contain wilderness characteristics, are further studied when the imprints are expected to become substantially unnoticeable either naturally or by reclamation.

The cumulative impact of the intrusion of human work can be adverse on the overall naturalness of the study area. This is a function of the size of the unit, the number, distribution and scale of the impacts.

### **Evaluation of Present Situation**

The following is a description and location of the structural imprints of human work in the inventory area or along the periphery. Each identified letter or number refers to the location of the imprint plotted on the corresponding field maps on file in the Albuquerque Field Office.

## **Fencelines**

Imprint A consists of a network of fencelines constructed primarily of metal and wood posts with barbed wire strands. Occasional metal or wooden posts are placed where a gate might be located. Most of these fencelines are either for livestock management (to separate grazing allotments and pastures) or for road rights-of-way (ROWs).

A-1 Originates in T. 6 N., R. 10 W., Section 6 and proceeds in a southeasterly direction from the New Mexico Highway (NM) 117 ROW fence. The pasture boundary fenceline is 1 mile long.

A-2 Originates in T. 6 N., R. 10 W., Section 6 and proceeds south to Section 7. The northern portion of the fenceline connects to the A-1 fenceline at ½ mile. The pasture boundary fenceline is ½ mile long.

A-3 Forms part of the NM 117 ROW fence and is located in T. 6 N., R. 10 W., Section 6. The ½-mile-long fenceline is located on the east side of NM 117. A metal gate is part of the ROW fenceline; it provides access to the Henson No. 2 Windmill and Cebolla Canyon.

A-4 Part of the pasture boundary fenceline from Section 6. Continues south in T. 6 N., R. 10 W., Section 7, ¼ mile to the Henson No. 2 Windmill.

A-5 Continues south in T. 6 N., R. 10 W., Section 7, from the Henson No. 2 Windmill to Section 18. The fenceline is ¾ mile long. A wooden gate on the fenceline (to allow access to an east pasture) is located on the section line between Sections 7 and 18.

A-6 Continues south in T. 6 N., R. 10 W., Section 18, for 1 mile. The fenceline follows the east side of the road. Approximately ⅓ mile south of the northern boundary of Section 18, the fenceline reaches a cattleguard.

A-7 Originates at the cattleguard in T. 6 N., R. 10 W., Section 18. The fenceline runs ½ mile west to the western boundary of Section 18.

A-8 Continues south, then turns east in T. 6 N., R. 10 W., Section 19, for .4 mile. Fenceline follows the east and north side of the road.

A-9 Continues east in T. 6 N., R. 10 W., Section 20, for ¼ mile to the Sand Canyon Windmill. Fence line follows the north side of the road.

A-10 Continuation of the east-side, NM 117 ROW fence in T. 6 N., R. 11 W., Section 1. The fenceline is .85 mile long.

A-11 Continuation of east-side, NM 117 ROW fence in T. 6 N., R. 11 W., Section 11. The fenceline is ¼ mile long.

A-12 Continuation of east-side, NM 117 ROW fence in T. 6 N., R. 11 W., Section 12, for .85 mile.

A-13 Continuation of east-side, NM 117 ROW fence in T. 6 N., R. 11 W., Section 14, for 1 mile.

A-14 Continues south for ¾ mile in T. 6 N., R. 11 W., Section 34 to the A-15 pasture boundary fence line.

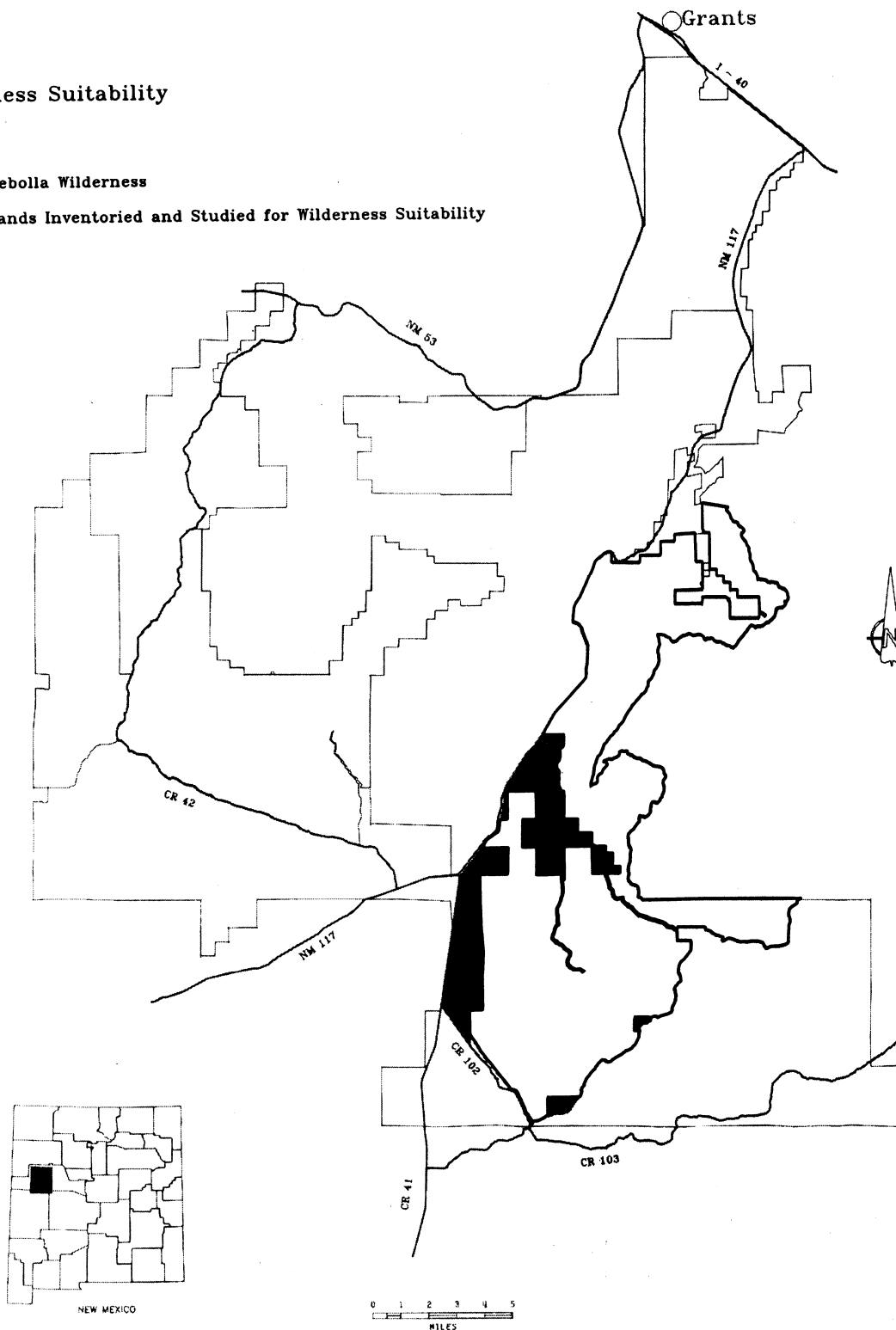
108 22'30" 15' 108 45' 107 37'30"  
35 15' 35 1

# El Malpais Planning Area

## Map J

### Wilderness Suitability

- Cebolla Wilderness
- Lands Inventoried and Studied for Wilderness Suitability



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108 22'30" 15' 108 45' 107 37'30"  
34 26' 34 2

A-15 Originates in T. 6 N., R. 11 W., Section 34, on the east side of County Road (CR) 41. This pasture boundary fenceline begins at a cattleguard and proceeds east for 3/4 mile, separating Sections 34 and 3.

A-16 Originates at the cattleguard and proceeds north for .4 mile on the east side of CR 41. The location is T. 6 N., R. 11 W., Section 34.

A-17 Originates at the northern end of fenceline A-16, then proceeds east to the Head Windmill and continues northeast to the A-14 fenceline. The A-17 fenceline is 1/2 mile long in T. 6 N., R. 11 W., Section 34.

A-18 Originates near the Henson No. 2 Windmill and follows the east side of a dirt road. This fenceline in T. 6 N., R. 10 W., Section 7, is 1/2 mile long and creates an enclosure of 40 acres. The bottom portion of this fenceline connects with the A-5 fenceline at the southern portion of Section 7.

A-19 Continues from the Sand Canyon Windmill in a southeasterly direction to the Henson No. 1 Windmill. This fenceline is 1/2 mile long and is located in T. 6 N., R. 10 W., Section 20.

A-20 Originates at the Henson No. 1 Windmill, proceeds north for 1/4 mile and connects to a rock barrier. This fenceline is located in T. 6 N., R. 10 W., Section 20.

A-21 Fenceline in T. 4 N., R. 10 W., Section 7, surrounds the entire boundary of this section. It is 4 miles long (with approximately 1 3/4 miles within the inventory area and 2 1/4 outside).

### **Range Improvements**

Imprint B is a 500-foot-deep well consisting of a maintained, 33-foot windmill tower with a 14-foot fan. Next to the windmill are two water storage ring tanks, one to hold 5,000 gallons and the other 500 gallons. The windmill and tanks are located within the NW1/4NW1/4 of Section 6, T. 6 N., R. 10 W. Approximately 5 acres are without vegetation.

Imprint C is a 475-foot-deep well consisting of a maintained, 33-foot windmill tower with a 10-foot fan. Adjacent to the windmill are a 5,000-gallon, water storage ring-tank and a 6-foot-diameter water storage tank. A 2-acre wire fence surrounds the

windmill and serves as a livestock holding trap. The North Pasture topographical map labels this structure as the Henson No. 2 Windmill, located within the W1/2NE1/4 of Section 7, T. 6 N., R. 10 W. Approximately 5 acres are without vegetation.

Imprint D is a cattleguard located in T. 6 N., R. 10 W., Section 18.

Imprint E is a 440-foot-deep well consisting of a maintained, 33-foot windmill tower with a 10-foot fan. Adjacent are a 5,000-gallon water storage tank and a 6-foot-diameter, water storage ring-tank. The Sand Canyon Windmill and tank are located within the NW1/4NW1/4 of Section 20, T. 6 N., R. 10 W. Approximately 5 acres are devoid of vegetation, with four standing wooden posts and several fallen posts about 50 feet away.

Imprint F is a 440-foot-deep well with a 33-foot windmill tower and a 10-foot fan. Adjacent to the windmill are a 6-foot-diameter, water storage ring-tank and a 5,000-gallon storage ring-tank. The windmill has not been maintained and probably is not operational. The Henson No. 1 Windmill is located within the NW1/4SE1/4 of Section 20, T. 6 N., R. 10 W.

Imprint G is a wooden corral with sandstone walls. The corral contains .25 mile of a fenced trap. The wooden trap with a wire wing trap is located on the east side of the corral. The wooden corral has not been maintained and is located adjacent to the Henson No. 1 Windmill within the NW1/4SE1/4 of Section 20, T. 6 N., R. 10 W.

Imprint H is the North Pasture Tank. The 1/2-acre dirt tank is located adjacent to the NM 117 ROW fence within the N1/2 of Section 12, T. 6 N., R. 11 W. The tank was filled with water.

Imprint I is the Head Windmill consisting of a 400-foot-deep well with a 33-foot tower and a 12-foot fan. Adjacent are two 6,400-gallon, water storage ring-tanks that are 22 feet in diameter and 2 1/4 feet deep. The maintained windmill and tank are located in T. 6 N., R. 11 W., Section 34. Approximately 2 to 3 acres are without vegetation.

Imprint J is a maintained wooden corral located in T. 6 N., R. 11 W., Section 34. Two wire traps direct livestock into the corral. A wooden log house is located next to the corral. The house is in disrepair, but appears to have historical significance.

Imprint K is a cattleguard located on the section line between Section 34, T. 6 N., R. 11 W. and Section 3, T. 5 N., R. 11 W.

Imprint L is the Indian Windmill consisting of a 400-foot-deep well with a 33-foot tower and a 12-foot fan. Adjacent are a 6-foot storage tank and a 6,400-gallon water storage tank that is 22 feet in diameter and 2¼ feet deep. The windmill and tank are located within the SE¼NE¼ of Section 15, T. 5 N., R. 11 W. An abandoned 6-foot-diameter water storage tank is also located at this site. Approximately 5 acres are without vegetation.

Imprint M is three dirt stock tanks that are vegetated and have not been maintained. The locations of these tanks are as follows.

M-1 NW¼SW¼ of Section 7, T. 4 N., R. 10 W. This tank holds ¼ acre-feet of water. Four upright wooden posts are in the tank, with a wooden sign nailed to an adjacent tree.

M-2 SE¼NE¼ of Section 7, T. 4 N., R. 10 W. This dirt tank holds ½ acre-feet of water, and is outside the inventory area but adjacent to it.

M-3 NE¼SE¼ of Section 7, T. 4 N., R. 10 W. This dirt tank is breached, but the storage capacity is ¼ acre-feet of water. The tank is outside the inventory area but adjacent to it.

Imprint N is a large, maintained dirt stock tank located in the SE¼SE¼ of Section 7, T. 4 N., R. 10 W. This tank is breached, has no storage capacity, and is outside the inventory area but adjacent to it.

Imprint O is a small dirt diversion dike located within the SE¼SE¼ of Section 7, T. 4 N., R. 10 W. This imprint is outside the inventory area but adjacent to it.

#### **Miscellaneous Imprints**

These intrusions are discarded items that can easily be removed.

Imprint P is an abandoned and rusted 55-gallon drum. The drum is split, with no evidence of hazardous materials. It is located in T. 6 N., R. 10 W., Section 6.

Imprint Q is a discarded rubber tire on the west side of the dirt road in T. 6 N., R. 10 W., Section 7.

Imprint R is a wooden pump jack that is part of the Rowe Homestead. The jack is located in T. 6 N., R. 10 W., Section 6, outside the fenced enclosure.

The Rowe Homestead is located in T. 6 N., R. 10 W., Section 6 and consists of a wooden building, fowl shed, barn and root cellar. This unstabilized homestead is surrounded by a 4-acre wire fence to protect it from livestock. A pedestrian walk-through was built for visitor access.

The Sandstone Homestead at the Henson No. 1 Windmill is located in T. 6 N., R. 10 W., Section 20. The stone homestead has collapsed, although the walls remain and a wooden corral (Imprint G) surrounds them. Visitors to the homestead must cross a deep arroyo.

#### **Vehicle Routes**

[Note: In this section, the letters and numbers in parentheses correlate to a route number and a 7.5-minute series, U.S. Geological Survey quadrangle map, with initials used in the inventory, e.g., (SC 19). The map is on file at the BLM Albuquerque Field Office.]

Route 1 is a low-use, revegetated two-track 1.4 miles long that originates in T. 6 N., R. 10 W., Section 6.

Route 2 is a low-use, revegetated two-track 1 mile long that originates in T. 6 N., R. 11 W., Section 1.

Route 3 is a low-use, revegetated two-track .3 mile long that is located in T. 6 N., R. 10 W., Section 7.

Route 4 is 1.6 miles long. It originates in T. 6 N., R. 11 W., Section 12 at the North Pasture Tank, and proceeds east past the Henson No. 2 Windmill. The usage is low.

Route 4A is a low-use, spur two-track from Route 4 that originates in T. 6 N., R. 11 W., Section 12. The route is ½ mile long.

Route 5 is a revegetated two-track originating in T. 6 N., R. 10 W., Section 7. The route is .6 mile long with low usage.

Route 6 (SC 19) is the main access route to Cebolla Canyon. It is a 6.2-mile, constructed and flat-bladed route with evidence of erosion. Originating at the ROW gate on NM 117 in T. 6 N., R. 10 W.,

Section 6, the route follows Cebolla Canyon and enters the wilderness boundary at the bottom of Section 28, T. 6 N., R. 11 W. The usage is medium and the road is 11 feet wide. It has been maintained by mechanical means but is in need of major maintenance, and some sections may need to be redirected. The route provides access for recreation users and ranchers.

Route 7 (NP 7) is a new, low-use vehicle route for authorized users only. This two-track could be used to gain access to range improvements. It is 8 feet wide and 2 miles long, originating at the wooden gate in T. 6 N., R. 10 W., Section 3 and terminating near the Henson No. 1 Windmill.

Route 8 is a low-use, revegetated two-track 1 mile long. The route originates east of the Henson No. 2 Windmill.

Route 9 (SC 18) is the main access to Sand Canyon. This cherry-stemmed route is 2 miles long from the connection of Route 6 to the bottom of Section 30 in T. 6 N., R. 10 W. This is a constructed route, flat-bladed by mechanical means. The usage of this 11-foot-wide route is medium, primarily for recreation and livestock activities. The upper part of the road is in poor condition.

Route 9A is a new, connects with Route 9 and is .3 mile long. It is located in T. 6 N., R. 10 W., Sections 19 and 30.

Route 10 is a revegetated two-track .6 mile long that connects with Route 9. It originates in T. 6 N., R. 10 W., Section 20 and runs south to Section 19.

Route 11 is a revegetated two-track .7 mile long that connects with Route 9. It begins in T. 6 N., R. 10 W., Section 20 and runs south to Section 30.

Route 11A is a revegetated two-track, a spur off Route 11 that is 1 mile long. It is located in T. 6 N., R. 10 W., Section 19.

Route 12 (SC 2) originates off CR 41 and is used to access the Head Windmill. It is a ½-mile-long, 8-foot-wide two-track with low usage by ranchers. The location is T. 6 N., R. 11 W., Section 34.

Route 13 originates at CR 41 and is used to access the Head Windmill. It is .2 mile long, authorized for use by ranchers, and located in T. 6 N., R. 11 W., Section 34.

Route 14 (SC 3) originates off CR 41 and runs through T. 5 N., R. 11 W., Sections 9 and 10. The low-use route serves as access to Homestead Canyon, reaching a locked gate at the wilderness boundary and continuing beyond the gate. The 1.1-mile-long two-track is 8 feet wide and is authorized for use by ranchers. Although the route is closed to the general public, is also used by recreationists.

Route 15 (SC 4) extends north and south of the Homestead Canyon Road. The southern portion ends at an arroyo and the northern portion fades out. The route is 7 feet wide and .8 mile long. This new, low-use route is located in T. 5 N., R. 11 W., Sections 3 and 10.

Route 16 (SC 5) is an old woodcutting route. This low-use route located in T. 5 N., R. 11 W., Section 10 is .3 mile long.

Route 17 (SC 7) allows the rancher access to the Indian Windmill off Armijo Canyon Road without entering the Cebolla Wilderness. This new, low-use two-track route is for authorized users only. It measures 7 feet wide and .6 mile long, located in T. 5 N., R. 11 W., Section 15. It has two arroyo crossings in good condition.

Route 18 is the Armijo Canyon Road, located in T. 5 N., R. 11 W., Sections 15 and 16. It is 1.2 miles long, ending in a parking area at the Cebolla Wilderness boundary. Used by recreationists and ranchers, the route is a limited-access two-track. The nearby Dittert Site is visited by the public.

Route 19 (SC 9) originates off CR 41 and is located in T. 5 N., R. 11 W., Sections 21 and 22. This low-use, revegetated route is 1.6 miles long.

Route 20 (SC 11) originates off CR 102 and is a low-use, revegetated two-track .4 mile long. It is located in T. 5 N., R. 11 W., Section 27.

Route 21 enters T. 4 N., R. 10 W., Section 7 from the west through a gate in the pasture fence that surrounds the section. This two-track, which originates from CR 102 and is 1.3 miles long, provides access to two dirt stock tanks. The low-use route is 7 feet wide.

Route 22 (BC 5) is a .3-mile-long, low-use two-track that leads to Pen's Windmill. It is 7 feet wide and located in T. 4 N., R. 10 W., Section 7, outside the inventory area but adjacent to it.

Route 23 is revegetated and .3 mile long. It is located in T. 4 N., R 10 W., Section 7, outside the inventory area but adjacent to it.

### **Conclusion**

As a whole, human imprints are scattered throughout the inventory area. In some cases they are screened by topography and vegetation and do not significantly detract from the area's naturalness. The imprints on naturalness exist from facilities built for livestock management, such as fences, windmills, watering tanks and troughs, and vehicle routes. The 33-foot-tall windmills with fans and associated watering tanks surrounded by barren ground are the most noticeable. However, they are scattered throughout the contiguous lands.

### **Outstanding Opportunity for Solitude or Primitive & Unconfined Recreation**

#### **Criteria for Solitude**

Solitude is the opportunity for a visitor to avoid the sights, sounds and evidence of other people within a particular study area. He or she should be able to feel alone or isolated.

#### **Evaluation of Present Situation**

Visitors in the core of the inventoried parcels and closest to the existing wilderness are well screened from others by the surrounding terrain and vegetation. Opportunities for isolation or solitude are diminished in some of the peripheral lands on the north and west, which are more open, with gentler slopes and sparse, low-growing vegetation. These lands are also closer to roads, their sights and sounds in the northern and western portions of the inventoried lands.

### **Conclusion**

A majority of the lands in T. 6 N., R. 10 and 11 W. have outstanding opportunities for solitude, primarily because of the topographic and vegetative screening. Less-than-outstanding opportunities are provided on some peripheral lands because of the lack of such screening and the presence of nearby roads.

### **Criteria for Primitive & Unconfined Recreation**

A study area that meets these criteria is favorable for those activities that provide dispersed, undeveloped recreation that does not require facilities or motorized equipment.

### **Evaluation of Present Situation**

Along with the adjacent Cebolla Wilderness, the canyons, drainages and mesas of the contiguous lands allow for unconfined movement over a large area. The semiarid climate allows for participation in nonmotorized, primitive recreation activities earlier and later in the year than in other typical, high-altitude wild areas. The mesas and rimrocks also provide numerous panoramic vistas of the surrounding landscape. Opportunities are also available for viewing cultural and wildlife resources.

### **Conclusion**

The modification of the Cebolla Wilderness boundary would extend the area in which outstanding primitive recreational opportunities such as hiking, camping, backpacking, photography, and viewing of wildlife and other special features could be enjoyed.

### **Supplemental Values**

#### **Criteria for Supplemental Values**

The Wilderness Act states that an area may also contain ecological, geological, or other features of scientific, educational, scenic or historical value. Special features of the area are optional, but the degree to which their presence enhances the area's suitability for wilderness designation should be considered. The evaluation should be based on an assessment of the estimated abundance or importance of each of the features.

#### **Evaluation of Present Situation**

The contiguous lands contain archeological and historical resources. Cultural resources in the Cebolla Wilderness range from early Archaic lithic scatters (about 7,000 years old) to historical homesteads and sawmills. Most common are small pueblos dating from Pueblo II through Pueblo III times (about 1,000 years old).

The Rowe Homestead is located in T. 6 N., R. 10 W., Section 6. The unstabilized site consists of a wooden building, fowl shed, barn and root cellar. A 4-acre wire fence surrounds the homestead to protect it from livestock. A pedestrian walk-through was built to allow visitor access.

The Sandstone Homestead at the Henson No. 1 Windmill is located in T. 6 N., R. 10 W., Section 20.

The stone homestead has collapsed, but the walls remain and a wooden corral (Imprint G) surrounds it.

### **Conclusion**

Special features within the contiguous lands, which include scenic values, cultural and historical values, contribute to the value of the area.

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BACKGROUND INFORMATION ON  
POTENTIAL NATURAL VEGETATIVE COMMUNITIES



## APPENDIX K

### BACKGROUND INFORMATION ON POTENTIAL NATURAL VEGETATIVE COMMUNITIES

The BLM has chosen the achievement of Potential Natural Communities (PNCs) as one of its vegetative goals for the Planning Area (refer to Chapter 2). Background information on the PNCs is briefly described below.

#### Ecological Sites

Soils in the Planning Area are included in the Cibola County soil survey performed by the Natural Resources Conservation Service (USDA, NRCS 1993--formerly the Soil Conservation Service). In the survey, areas with similar soil classification characteristics (e.g., depth, texture, source materials) are grouped as "soil map units."

The NRCS further categorizes the soil map units into "ecological sites." An ecological site is an area of rangeland with a specific Potential Natural Community (PNC) and specific physical site characteristics, which differs from other kinds of rangeland in its ability to produce vegetation and respond to management techniques (BLM Technical Reference 4400-4). In other words, an ecological site is an area that has the potential to produce a unique vegetative community.

In its Ecological Site Guides, the NRCS describes the sites in terms of their vegetative

composition. For each site, the PNC is the mixture of plants that would become established if natural processes were allowed to be completed. The Site Guides express this mixture as the combination of a range of percentages. For example, the PNC for a given site may contain 20 to 30 percent trees, 50 to 60 percent grasses, 10 to 20 percent shrubs and 10 to 20 percent forbs.

#### Ecological Condition

Comparing the PNC (ideal) to the existing plant mixture on a given site then yields a measure of that site's "ecological condition," or percentage of similarity to the PNC. Ecological condition is based on the concept of plant succession. Succession is the orderly process of community change, the sequence of communities that replace each other in a given area over time, as the result of natural processes (e.g. climate, fire). Each successional community is referred to as a "seral stage," ranging from Low to Climax. Table K-1 shows the seral stages, the percentage of plants each contains as compared to the ideal (climax) mixture or PNC, and the number of Planning Area acres currently found in each seral stage. Table K-2 summarizes the ecological condition of the grazing allotments in the Planning Area.

TABLE K-1

#### SERAL STAGES IN THE PLANNING AREA

Seral Stage	Planning Area Acres	% Similarity to PNC <sup>a</sup>
Low	598	0-25
Middle	107,296	26-50
High	209,697	51-75
Climax (PNC)	0	76-100
Total Acres	317,591	---

Note: <sup>a</sup> PNC-Potential Natural Community.

TABLE K-2

**ECOLOGICAL CONDITION OF GRAZING ALLOTMENTS  
WITHIN THE PLANNING AREA <sup>a</sup>  
(public land acres)**

Allotment Number	Allotment Name	Ecological Condition (Seral Stage) <sup>b</sup>		
		Low	Middle	High
201	Cerritos de Jaspe	0	1,753	6,779
202	Bright's Well	0	80	545
203	Malpais	0	57,930	118,659
204	Raney	0	1,582	551
205	Los Pilaes	546	862	14,342
206	Little Hole-in-the-Wall <sup>c</sup>	0	794	880
207	Cerro Brillante	0	5,239	17,849
208	Loma Montosa	0	3,907	0
209	Techado Mesa	0	23,063	6,515
210	Los Cerros <sup>d</sup>	0	9,817	36,701
211	Ventana Ridge	0	2,216	6,821
438	Monument Lake	0	2,560	0
439	La Vega	52	53	55
Totals		598	107,296	209,697

Notes: <sup>a</sup> Allotments #222 (Chical) and #457 (Palomas) shown on Map -- have recently been acquired from the State of New Mexico and are not yet inventoried.

<sup>b</sup> No allotments in the Planning Area are in the climax seral stage.

<sup>c</sup> Includes 640 acres in the Arrosa Allotment (#226).

<sup>d</sup> Cerro Chato (#200) and Los Cerros (#210) have been combined.

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CHANGES IN LIVESTOCK GRAZING MANAGEMENT  
IN THE EL MALPAIS NCA & PLANNING AREA

APPENDIX L

## APPENDIX L

### CHANGES IN LIVESTOCK GRAZING MANAGEMENT IN THE EL MALPAIS NCA AND PLANNING AREA

#### Administrative Changes

In 1987, the BLM completed a major land exchange with the New Mexico State Land Office. Approximately 27,000 acres of public land in Torrance County were exchanged for approximately 29,000 acres of state land in Cibola County.

The state had leased all the acquired acres for grazing. The BLM agreed to honor these leases until their expiration, and then to incorporate them into public land grazing. The majority of the acquired lands were already within BLM grazing allotments and were easily incorporated.

However, in two situations, the acquired state lands were completely surrounded by large blocks of private land, with no other BLM public land available in the grazing area. As a result, the two state lessees did not have public land grazing privileges. Each person was found to be qualified for these privileges, and was issued a grazing lease, one on the Chical (#222) and one on the Palomas (#457) Allotment.

In another administrative change, the BLM in April 1995 combined the Cerro Chato (#200) and the

Los Cerros (#210) to form a single allotment. The combined allotment is now referred to as the Los Cerros (#210).

#### Other Changes Since Completion of the El Malpais GMP (1991)

As specified in both the *Rio Puerco* and the *Socorro RMPs*, the BLM initiated intensive monitoring studies on the I category allotments. Based on the studies, the agency reviewed grazing preferences and issued decisions in 1992 to establish new preferences. Using New Mexico Department of Game & Fish estimates of big game populations (antelope, deer and elk) for each of the I allotments, the BLM allocated sufficient wildlife forage. Table L-1 displays the grazing preference at the onset of the monitoring studies and after the decisions (including the wildlife allocations) were issued.

In addition to adjusting grazing preferences, the BLM has made other changes in grazing management in the Planning Area since completion of the *El Malpais NCA General Management Plan*. These are listed in Table L-2.

**TABLE L-1**

**ADJUSTMENTS IN GRAZING PREFERENCE  
IN THE PLANNING AREA (1992)**

Allotment Number	Allotment Name	Grazing Preference (AUMs) <sup>a</sup>		Wildlife Forage Allocation (AUMs)
		Before Monitoring	After Monitoring	
203	El Malpais	14,899	14,899	2,332
205	Los Pilaes	2,446	1,716	483
207	Cerro Brillante	4,086	3,572	238
208	Loma Montosa	672	997	87
209	Techado Mesa	5,294	4,768	1,470
210	Los Cerros <sup>b</sup>	5,670	5,420	349
Totals		33,067	31,372	4,959

Notes: <sup>a</sup> Grazing preference is the total number of AUMs grazed by livestock on the public lands (43 CFR 4100.0-5). An AUM is an Animal Unit Month, or the amount of forage needed to sustain one cow or its equivalent for one month (43 CFR 4100.0-5)

<sup>b</sup> AUMs are the combined total for Los Cerros and the former Cerro Chato Allotments.

**TABLE L-2**

**ONGOING GRAZING MANAGEMENT PLANNING  
FOR ALLOTMENTS OVERLAPPING THE PLANNING AREA**

Allotment Number	Allotment Name	Management Change
205	Los Pilaes	Grazing Plan (1993) <sup>a</sup>
208	Loma Montosa	No grazing, June through September (1992)
209	Techado Mesa	Grazing Plan (1993) <sup>a</sup>
210	Los Cerros <sup>b</sup>	Grazing Plan (1995) <sup>a</sup>

Notes: <sup>a</sup> Includes pasture use schedule that provides for regular rest from livestock grazing use.

<sup>b</sup> Plan includes the former Cerro Chato Allotment.

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AUMs PERMITTED IN EL MALPAIS NATIONAL MONUMENT  
THROUGH DECEMBER 31, 1997

## APPENDIX M

### AUMS PERMITTED IN THE EL MALPAIS NATIONAL MONUMENT THROUGH DECEMBER 31, 1997 <sup>a</sup>

Allotment Number	Allotment Name	Monument Acres	Monument AUMs
201	Cerritos de Jaspe	10,880	129
203	El Malpais	40,179	1,172
204	Raney	7,360	105
205	Los Pilares	1,670	312
206	Little Hole-in-the-Wall	2,134	180
208	Loma Montosa	5,120	1,950
210	Los Cerros	12,254	625
211	Ventana Ridge	1,794	182
Totals		81,391	4,655

Note: <sup>a</sup> AUMs in the BLM portions of these allotments have now been reduced.

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TECHNICAL DESCRIPTION OF THE  
BIOPHYSICAL LAND UNIT (BLU) MODEL



## APPENDIX N

### TECHNICAL DESCRIPTION OF THE BIOPHYSICAL LAND UNIT (BLU) MODEL

Biophysical Land Units (BLU) are homogeneous, ecological response units derived using a Geographic Information System (GIS), or ecological regions or divisions that are spatially analyzed and defined on the basis of contributing physical ecological components and cohesive interactive dynamics. The term "biophysical" represents the combination of biological and physical attributes.

The most important emphasis of the model is its focus on delineating and describing the expression of a dynamic system captured in a snapshot in time. There are, however, several other emphases of BLUs that separate the concept from other land inventory and mapping methods. Among these emphases are: (1) the BLU model can be used to consider the responses (or lack thereof) of the units to both natural and manipulated influences through time; (2) the spatial extent of an ecological response, using BLUs, can be mapped and analyzed without necessarily being visually discernible in the field; and (3) the amount of detail or scale of a BLU (the level in the hierarchy of the model in which analysis is accomplished) can be adapted to fit the question asked.

The base or "core" BLU data are derived from satellite remote sensing data, Digital Elevation Models (DEMs), soils data, and surface water data. The satellite data provide the "snapshot in time," or total area coverage of current condition, and are particularly useful in land areas that are difficult to access. The core layers (and if desired, any subsequently added hierarchical or "fine tuning" layers) are not merely merged, or defined through arbitrary visual assessment. BLUs are delineated when these "core" layers are modeled in matrix form, through Boolean logic (deductive operations of intersection and symmetric difference).

In other words, the matrix of defined components (vegetation/landcover, soils, surface water, slope, elevation, and aspect) draws the BLU boundary lines. Therefore, human perspective (emotions, values, and visual interpretation) do not predetermine the spatial delineation of BLUs. If an ecotype component combination has not been anticipated in the formulation of the matrix, that spatial area "drops out" of the BLU model. This simply results in a

blank space on the map that is reanalyzed, one map (component) layer at a time, combined with field verification of the site. In this way, previously unknown anomalies, ecotypes, ecological responses, or disturbances may be identified. Finally, the hierarchical concept of BLUs, both in scale and attribute detail, contained in a GIS framework allows addition or deletion of data layers, integration of multi-temporal datasets, and analysis of change detected and multiple scenarios.

BLUs can be used to spatially model the extent and composition of ecotypes (and therefore biodiversity) by recognizing existing spatial divisions based on ecological responses. In other words, ecosystem biodiversity can be assessed across a region by the differentiation and location of separate BLUs, homogeneous response units defined spatially by attribute composition. A desirable effect of using BLUs to spatially model biodiversity is the retention of the "patchy" detail of existing environments.

BLUs provide spatial definition of complex ecologic details in a form that can be graphically displayed in a single map layer. This single BLU layer can display the first level of analysis--the homogeneous mix of the "core components" of existing environments, to which other defining layers (such as administrative boundaries or cultural features) can be added for reference, without confusing the displayed information beyond the point of recognition and interpretation. The focus is on spatial patterns, the assemblages of those patterns (reflecting communities) and the ecotones that provide the transition between homogeneous areas. This approach allows the analyst to better understand the dynamics occurring in the ecological system, without becoming overwhelmed with the specifics of multiple data layers. The emphasis, therefore, becomes one of dynamics, anomalies, edge conditions, stability and sustainability.

#### ASSESSMENT AND MONITORING

When areas of anomalies have been identified, field verified, and found to require more detailed analysis, another step in the hierarchy of BLU

resolution is added. Additional spatial data layers can be overlaid to isolate possible contributing dynamics, or site-specific data can be collected, geocoded, and analyzed.

Enhancements to BLU modeling methods could use site-specific data. Site data, like vegetation transects, correlate detailed (localized) snapshots in time to the broader, more generalized spatial snapshots in time provided by satellite remote sensing data. Satellite data, along with subsequently derived layers like BLUs, provide total area coverage. It has long been recognized that one of the most practical uses of satellite data is the identification of areas where more specific data collection and evaluation methods are required. This same simple notion supports the BLU concept of hierarchical scales of detail, allowing bi-directional flow of information between generic, regional dynamics, and local, more specific dynamics.

A practical example is to automate and link transect data to satellite data and BLUs. The approach is to use vegetation transect data collected into polycorder files and Global Positioning System (GPS) data for geocoding transect location. At those transect points, a simple compass is used to determine the vector of transects in relationship to spectral classes and BLUs. Locations of transects would include sites well within a homogeneous area, allowing a clear definition of the vegetative community assemblages. Locations could also include transects perpendicular to ecotones, thus defining spectral or community boundaries. Transects could also be long enough to bisect the boundary and allow for boundary shifts through time. By correlating these datasets, it should be possible to track subtle shifts in local ecological dynamics through the relationship of vegetation community changes and spatial change identified by BLUs.

Change that has already been detected and analyzed using BLUs considers the rate, amount, and direction of change, as well as the relationship of change to management manipulations and fluctuations in weather patterns. For example, habitat patchiness, difficult to quantify without GIS-derived BLUs and critical to ecosystem management, has been recognized as becoming more homogeneous in some areas of the El Malpais National Conservation Area (NCA).

Another use of BLU tracking of ecological change is the delineation and monitoring of response components that represent only a small percentage of a protected area. Tracking these areas, and using GIS to overlay management alternatives, could eliminate the areas from consideration for incompatible uses like a camping area, interpretive trail, or range improvement. GIS graphic representation of BLUs and conflict resolutions are then useful for policy implementation within an agency, and for public information.

The hierarchical framework of BLUs, besides providing flexibility in scale and detail of components of current conditions, is meant to facilitate correlation with other historical and continuously collected datasets. It is also meant to help provide "common ground" ecological datasets among scientific and/or management disciplines. This facet of the BLU concept is not meant to establish a totally new perspective, but rather to provide a methodology to link past and present datasets with future predictions. Improving methods of relating historic and current environmental data is crucial to identifying past patterns, developing analysis models for predicting change, evaluating historic manipulations of natural resources, and projecting preferred management alternatives.

BLUs have been used to help define and monitor "potential" and "desired" plant communities. Definition of potential plant communities includes an evaluation of the capability of a geographic area to support different plant species and assemblages. As potentials and capabilities are defined and understood, progress can be made toward managing for desired plant communities. Such management considers not only the capability of the land, but the social, economic, and political parameters that define land management alternatives. Using multi-temporal BLU datasets, the progress through time of current conditions, the relationship of potential and desired conditions can be measured in acreage and percent.

When these ecological analyses or identifications of change are accomplished, layers of cultural activities or management actions can be added to determine correlation. If changes are linked to management actions, are the changes acceptable? Can the amount and location of change be predicted? Change reflecting a developed, trailhead parking lot that controls vehicular impacts and mitigates erosion

potentials may be very acceptable. Disappearance of an "undesirable" BLU in favor of a "desirable" BLU may be acceptable. An excessive percentage of loss of a BLU that represents a small, unique percentage of the NCA, or a threatened habitat, would be unacceptable.

## CONCLUSION

Beyond the BLU applications of inventory, monitoring, and capability assessment, other applications that can be used or developed include compatibility analysis (between resource management programs), suitability analysis (alternative selection by value-based criteria), feasibility analysis (alternative selection dependent upon land capability and fiscal resources), and problem analysis (issue-specific, solution-driven study to support an action).

Example analyses could include determination of where to expect visitation based on visual resources

and recreation opportunities; appropriate locations for trails or campsites; seasonally dependent impacts and possible closures; and interactions/conflicts between such interests as wildlife, recreation, livestock grazing, and uses by indigenous peoples.

These BLU analyses using geographic technologies are part of an assortment of tools for monitoring ecological responses and changes in natural resource management. A dynamic, responsive model like BLUs provides a framework for continuing analyses of natural and cultural components. Such a model facilitates management decisions as whether to maintain a condition, allow change, encourage change, or set limits for change--all in relationship to the capabilities and limitations of the ecosystem. Ultimately, BLUs are a combination of subtle, yet incredibly obvious spatial-temporal notions. They focus first on ecological dynamics (responses) separate from human expectations and desires, helping to sort the puzzle pieces for natural resource monitoring and managing.

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TECHNICAL INFORMATION ON DIGITAL  
GEOGRAPHIC DATA SOURCES,  
PROCESSING,  
ANALYSES &  
MAPPING

APPENDIX O

## APPENDIX O

### TECHNICAL INFORMATION ON DIGITAL GEOGRAPHIC DATA SOURCES, PROCESSING, ANALYSES AND MAPPING

Geographic processing, analyses and mapping were accomplished in this planning effort on a Prime computer using a Prime operating system. Geographic Information System (GIS) software employed on this platform included: Automated Digitizing System (ADS), Map Overlay Statistical System (MOSS), Map Analysis and Processing System (MAPS), and Cartographic Output System (COS).

Base data, in vector format, were digitized at a scale of 1:24,000, and/or edited and updated at that scale. These data included:

- Administrative boundaries (e.g., Planning Area, NCA),
- Fire management areas,
- Livestock grazing allotments,
- Land ownership,
- Roads,
- Continental Divide National Scenic Trail,
- Soil groupings, and
- Facilities.

Digital Elevation Model (DEM) data, in raster (cell) format at the 30- meter scale, were purchased from the United States Geological Survey.

Vegetation/landcover data were derived from Landsat Thematic Mapper (satellite remote-sensing) data. These data were field verified during the classification process.

Because vegetation/landcover and DEM data are in raster (cell) format, analyses that required these data layers were accomplished in this format. For example, analyses were made of potential and desired plant communities in reference to the administrative boundaries of livestock grazing allotments and wilderness. The vector format data of soil groupings, allotments and wilderness boundaries were rasterized to be compatible for overlay analyses with vegetation and DEMs.

All raster-format analyses were accomplished at a 30-meter scale, except for Visual Resource Management (VRM), Recreation Opportunity Spectrum (ROS), and Off Highway Vehicle (OHV) data analyses. These analyses were accomplished at a 100-meter scale, which was more appropriate to the smaller- scale, more generalized or relative nature of the data. Also, these data were modelled through multiple stages of complex overlay analyses that required intensive computer processing, and because the relative nature of the data did not require a more specific scale, more timely processing was accomplished at the 100-meter scale.

Hardcopy output maps of digital data were generated through the COS program, and in some cases cartographically enhanced by hand.

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## TYPICAL WILDLIFE PROJECTS

# APPENDIX P

## APPENDIX P

### TYPICAL WILDLIFE PROJECTS

#### WATER DEVELOPMENTS

Water guzzlers come in many varieties, but most are in the 400-square-foot range. A 10,000-square-foot area is generally fenced to protect the water development from livestock. A typical water development would cause a direct long-term disturbance of approximately 400 square feet and an indirect, short-term disturbance of vegetation (crushing by vehicle and foot traffic during construction).

Water development projects would not cause any irreversible damage or irretrievable commitment of resources. These projects could be dismantled and removed and the disturbed areas would revegetate.

#### VEGETATIVE MANIPULATION

Vegetative manipulation can be accomplished by five main methods: livestock management, prescribed and wildland fires, mechanical means, chemical means, or biological means. Vegetative manipulation for wildlife enhancement is generally accomplished through the use of livestock management and prescribed fires.

The following are some anticipated impacts to other resources created by prescribed fire to enhance wildlife habitats.

- **Loss of Vegetation:** A portion of the existing vegetation would be consumed by fire. Burn plans would emphasize prescriptions to create a mosaic of vegetative stages. Burns would be conducted to allow the existing wildlife populations to continue to use the area.
- **Scenic Values:** These would be reduced for a period of time, depending on the habitat and size of the treatments. Grass and small brush treatments are generally short term and blend back into the surrounding area within 1 to 3 years. Treatments in piñon/juniper woodlands or forest habitats would have short-term (2- to 5-year) or long-term (more than 5-year) impacts, depending on the prescription. Burns that took out the grass and brush understory and only a few trees would create a short-term impact on scenic values.

Burns that were used to reduce woodland habitat or create a forest parkland type habitat would create long-term impacts by taking out trees to create openings and reduce densities. These dead standing trees could remain for decades. However, by incorporating fire back into a functioning ecosystem, the overall scenic values of the area would be enhanced.

- **Air Quality:** This would be diminished during and immediately after the fire.
- **Loss of Livestock Forage:** Prescribed fires would consume livestock forage within treatment areas. The overall loss of forage would be minimized within any one allotment to maintain ongoing livestock operations. The long-term effect on livestock and wildlife forage would be to enhance the diversity of vegetation. In areas where brush and/or trees were reduced, additional growth of herbaceous vegetation would be expected.

#### FENCES

A mile of fence would cause direct, long-term disturbance of approximately 50 square feet of vegetation. This disturbance would be considered long term because fences generally last 25 years or more. Short-term vegetative disturbance would be caused by vehicle and foot traffic during construction. This disturbance would generally be noticeable for a few weeks to a few months, depending on the terrain and type of equipment used. In some instances, where a fence was constructed through closed woodlands, a loss of approximately ¼ acre of trees per mile of fence would occur.

Fence projects would not cause any irreversible or irretrievable commitment of resources. These projects could be dismantled and removed, and the disturbed areas would generally revegetate. For grass-shrub habitats, the disturbance would be short-term and revegetation would generally occur over a 2- to 5-year period. In woodland habitat, the disturbance would be long term and revegetation would generally take 10 to 20 years or more.

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## BIOLOGICAL ASSESSMENT

# APPENDIX Q



## **APPENDIX Q**

### **BIOLOGICAL ASSESSMENT**

The BLM is preparing a Biological Assessment for the Planning Area as part of the informal consultation process under Section 7 of the Endangered Species Act. At the end of the informal consultation process, if formal consultation is not required, the

Biological Assessment will be attached to this plan. If formal consultation is required, the Biological Assessment and the Biological Opinion from the U.S. Fish and Wildlife Service will be attached.

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INFORMATION ON CATRON COUNTY LANDS  
RECOMMENDED FOR CONGRESSIONAL INCLUSION  
IN THE EL MALPAIS NATIONAL CONSERVATION AREA

APPENDIX R

## APPENDIX R

### INFORMATION ON CATRON COUNTY LANDS RECOMMENDED FOR CONGRESSIONAL INCLUSION IN THE EL MALPAIS NATIONAL CONSERVATION AREA

#### EL MALPAIS NATIONAL CONSERVATION AREA (NCA) PLAN

The Albuquerque Field Office is releasing the *Draft El Malpais NCA Resource Management Plan Amendment* (Plan Amendment or Draft Plan) and *Environmental Impact Statement* (EIS) in June 1999. The legislation designating the NCA mandated the development of a General Management Plan (GMP), which the BLM considered to be an activity-level document rather than a formal Plan Amendment and EIS. The GMP and accompanying Environmental Assessment (EA) were completed in 1991. Upon appeal by several wilderness advocates, the Interior Board of Land Appeals (IBLA) decided that the GMP/EA was inadequate and required the BLM to prepare a Plan Amendment/EIS.

The BLM El Malpais Planning Team used the best available scientific, social, economic and cultural data to develop the four alternative management strategies analyzed in the Draft Plan/EIS. Input from local residents, private landowners, recreational user groups, environmental and conservation groups, cultural preservation interests, other government agencies (federal, state, county, local and tribal) was carefully considered in the developing the Draft Plan/EIS. The public will have additional opportunities to provide input during a 90-day Draft Plan/EIS comment period.

#### BACKGROUND

- The 262,600-acre El Malpais NCA was established in December 1987 with the passage of Public Law (P.L.) 100-225.
- Two wildernesses, the Cebolla and West Malpais, were also established by P.L. 100-225 and are part of the NCA.
- The Plan Amendment integrates recent information with the extensive work previously completed for the GMP. Using an interdisciplinary approach, the planning team has developed adaptive management alternatives that include

monitoring and inventory components designed to assess the effect of management on ecosystem health over time.

- The NCA is currently managed under the guidance of existing policy, the El Malpais legislation, the Rio Puerco Resource Management Plan (RMP--1986), and the Socorro Grazing EIS (1982).
- Construction activities in the NCA have been limited to the El Malpais Ranger Station (completed in 1991) and the area around La Ventana Natural Arch. These two projects were initiated based on approved EAs before the GMP appeal.
- Traversing part of the NCA and National Monument, 36-mile County Road 42 was dedicated as the Chain of Craters Back Country Byway in January 1994. The NCA is also home to a segment of the Continental Divide National Scenic Trail.
- Based on aboriginal land use claims, several tribal governments—most notably Acoma Pueblo— strenuously objected to establishment of the NCA and National Monument. Throughout the Draft Plan/EIS process, the BLM has consulted with the affected tribes and attempted to address their concerns.
- The Draft Plan/EIS includes a recommendation to legislatively amend the current Cebolla Wilderness boundary to include contiguous lands recently acquired by the BLM and exclude 160 acres of Acoma Pueblo land. A “unsuitable” recommendation on the Chain of Craters Wilderness Study Area (WSA) is also included.
- The legislation establishing the El Malpais NCA provided for continued livestock grazing in the area. While the Draft Plan/EIS does not include allotment-specific analyses under the National Environmental Policy Act (NEPA), these have been initiated on all New Mexico grazing allotments. Several allotments within the NCA are considered high priority; NEPA analyses have

been initiated and are expected to be completed for those allotments during 1999.

- Portions of several grazing allotments within the NCA extend into Catron County. Although they are within the BLM Socorro Field Office boundaries, these small portions have been managed out of the Albuquerque Field Office through an administrative agreement. The plan recommends legislative extension of the NCA boundaries to include these areas. In the interim, grazing will continue in the area except as specified in the Socorro RMP.
- Unlike a BLM administrative designation (e.g., Area of Critical Environmental Concern or Special Management Area), Congressionally legislated designations—such as an NCA—do not require NEPA analyses or studies before designation. If the Congress officially extends the NCA boundaries, the BLM will then undertake NEPA analysis as part of the resource management planning process for the newly designated portions of the NCA.
- Two required public hearings will be scheduled during the Draft Plan/EIS comment period. The Final Plan and Record of Decision will address and incorporate comments received during the 90-day draft comment period.

## THE UNITS & THEIR RESOURCES

Two units of land are involved. The **Techado Mesa-SFO Unit** includes approximately 5,000 acres of public land and 40 acres of privately owned land located in Township 4 North, Range 9 West, Sections 13 through 18 and 22. This unit also includes land in Socorro County (Section 18 in T. 4 N., R. 8 W.).

The **Tank Canyon-SFO Unit** includes approximately 10,100 acres located in T. 4 N., R. 10 W., Section 30 and T. 4 N., R. 11 W., Sections 13 through 16, 22 through 27 and 32 through 36. Public land accounts for 9,900 acres, while the other 200 acres are privately owned.

Both units adjoin lands in Cibola County currently being recommended for inclusion in the El Malpais NCA. These lands have resource values similar to those in the NCA. They are discussed below to the extent of the current available data.

## Recreation & Facility Development

### Recreation

The 14,900 acres of public land provide opportunities for extensive and unstructured recreation, including day hiking, backpacking, big game hunting, off-highway vehicle driving, horseback riding, camping, mountain biking, and gathering noncommercial products such as piñon nuts. The BLM Socorro Resource Management Plan (1989) did not assign Recreation Opportunity Spectrum (ROS) classes to these lands.

### Facilities

Public lands within these two units provide no developed facilities, including trails, for recreational use. Such use of the area is dispersed, with users not dependent on developed facilities.

Inclusion of the units in the NCA would not affect recreational use or facility development.

### Interpretation

Interpretation is a management tool that connects visitors with resources, promotes understanding of ecosystems and cultures, reinforces visitor safety and promotes resource management decisions. This tool has been applied to public lands within these two units through brochures for all lands administered by the Socorro Field Office. One of the management goals for the Newton Site in Tank Canyon is to protect the site for public interpretation.

Inclusion of the units in the NCA would not affect interpretation.

### Access & Transportation

Transportation systems providing access to the public land within the Tank Canyon and Techado Mesa-SFO Units vary from BLM roads to county roads. Cibola County Road 103, north of the Techado Mesa-SFO Unit, serves as the primary vehicle route for access to public land in this unit. Catron County Roads A-081 and A-083, which traverse the Tank Canyon-SFO Unit along with numerous BLM roads and vehicle routes, provide access to the public land in that unit. Access to public land in both units may also be gained by hiking and horseback.

Both units are classified as open to off-highway vehicle (OHV) use, except for a 40-acre tract of public land surrounding the Newton archeological site in the Tank Canyon-SFO Unit. Vehicle use on this 40 acres is limited to existing roads and trails. Bicyclists also can access these two units by using the existing vehicle travel routes. Cross-country travel is limited because of terrain and vegetative conditions.

Inclusion of the units in the NCA would likely limit OHV use.

### **Wilderness Management & Suitability**

The 14,900 acres of public land do not contain any designated wilderness or a Wilderness Study Area (WSA). Inclusion of the units in the NCA would not affect wilderness suitability nor management.

### **Cultural Resources**

A major concentration of cultural resources exists along the New Mexico Highway 117 corridor in the Spur, Cebolla, and Breaks Units of the NCA. This concentration of sites continues to the south into the Tank Canyon-SFO Unit. The cultural resources in this region are not well documented, but they are believed to include numerous prehistoric pueblo ruins dating to the Pueblo II and Pueblo III periods (A.D. 950 to 1325).

Among these is the Newton Site, a major ruin with approximately 165 ground-floor rooms that is believed to date between A.D. 1200 and 1325. The site includes distinctive architectural features such as an enclosed plaza, ladder-type construction, and perhaps a blocked-in kiva. Portions of the site were excavated by Theodore Frisbie in the mid-1960s, and the BLM completed some stabilization at this site by the BLM in the late 1970s. In addition to prehistoric resources, numerous historical homesteads are also located in this area.

Inclusion of the units in the NCA would facilitate the management of these cultural resources.

### **Wildlife**

The Tank Canyon and Techado Mesa-SFO Units provide habitat for a wide variety of wildlife species. The Tank Canyon-SFO Unit (9,900 acres) adjoins the southwestern edge of the El Malpais Planning Area and is characterized by mesas, canyons, buttes

and wide valleys. The dominant vegetation is shrub-grassland with intermingled piñon-juniper woodlands. This area is attractive and important habitat for mule deer, coyotes and many species of birds.

The Techado Mesa-SFO Unit (5,000 acres) adjoins the southeastern edge of the Planning Area and is characterized by sandstone mesas, buttes capped by lava flows, and wide valleys. The area is predominantly piñon-juniper woodlands and scattered ponderosa pine forests. Small playa lakes form seasonally on the mesa top. This area is attractive and important habitat for mule deer, turkeys, Abert's squirrels, and tree- and hole-nesting wildlife. Elk also are seen occasionally.

Inclusion of the units in the NCA would not affect wildlife.

### **Threatened, Endangered & Other Special-Status Species**

Ten federally listed threatened or endangered, 2 proposed threatened, 2 candidate, and 36 BLM sensitive species are known or potentially could occur on public lands within the SFO Units. These are shown in Table R-1. Informal/formal consultation under Section 7 of the Endangered Species Act would be undertaken if any actions were proposed for these lands that would create a "May Affect" situation for any listed or proposed species.

Inclusion of the SFO Units in the NCA would not change the management of threatened, endangered or special-status species nor their habitats.

### **Vegetative Resources**

#### **Forests & Woodlands**

Lands in the two SFO Units contain significant piñon-juniper woodlands and isolated ponderosa pine forests. The piñon-juniper woodlands have good potential to support commercial and personal-use fuelwood cutting, although only limited activity has taken place over the past 10 years.

Both units are within the Socorro Field Office's Cox Camp Woodland Management Area, which was designated to emphasize use for fuelwood, posts and poles. Because of the low demand for these types of products, no management plan to guide specific projects within the area has been developed. However, because of increasing residential subdivision

**TABLE R-1**  
**SPECIAL-STATUS SPECIES LIST FOR CATRON COUNTY**

Common Name	Scientific Name	Status <sup>a</sup>
<u>Mammals</u>		
Allen's (Mexican) big-eared bat	<u>Idionycteris (=Plecotus) phyllotis</u>	SC
big free-tailed bat	<u>Nyctinomops macrotis</u> (=Tadarida m., T. molossa)	SC
black-footed ferret	<u>Mustela nigripes</u>	E
cave myotis	<u>Myotis velifer</u>	SC
greater Western mastiff bat	<u>Eumops perotis californicus</u>	SC
fringed myotis	<u>Myotis thysanodes</u>	SC
long-eared myotis	<u>Myotis evotis</u>	SC
long-legged myotis	<u>Myotis volans</u>	SC
occult little brown bat	<u>Myotis lucifugus occultus</u>	SC
pale Townsend's (=Western) big-eared bat	<u>Plecotus townsendii pallescens</u>	SC
Southwestern otter	<u>Lutra canadensis sonora</u>	SC
small-footed myotis	<u>Myotis ciliolabrum</u>	SC
spotted bat	<u>Euderma maculatum</u>	SC
Yuma myotis	<u>Myotis yumanensis</u>	SC
<u>Birds</u>		
American peregrine falcon	<u>Falco peregrinus anatum</u>	E
Arctic peregrine falcon	<u>Falco peregrinus tundrius</u>	E (S/A)
Baird's sparrow	<u>Ammodramus bairdii</u>	SC
bald eagle	<u>Haliaeetus leucocephalus</u>	T
ferruginous hawk	<u>Buteo regalis</u>	SC
Interior least tern	<u>Sterna antillarum</u>	E
loggerhead shrike	<u>Lanius ludovicianus</u>	SC
Mexican spotted owl	<u>Strix occidentalis lucida</u>	T
Mountain plover	<u>Charadrius montanus</u>	PT
Northern goshawk	<u>Accipiter gentilis</u>	SC
Southwestern willow flycatcher	<u>Empidonax traillii extimus</u>	E w/CH
Western burrowing owl	<u>Athene cunicularia hypugea</u>	SC

TABLE R-1, concl'd

Common Name	Scientific Name	Status <sup>a</sup>
<u>Fish</u>		
Chihuahua catfish	<u>Ictalurus</u> sp.	SC
Desert sucker	<u>Catostomus clarki</u>	SC
Gila chub	<u>Gila intermedia</u>	C
Gila trout	<u>Oncorhynchus gilae</u>	E
loach minnow	<u>Rhinichthys cobitis</u>	T
longfin dace	<u>Agosia chrysogaster</u>	SC
roundtail chub	<u>Gila robusta</u>	SC
Sonora sucker	<u>Catostomus insignis</u>	SC
speckled dace	<u>Rhinichthys osculus</u> (Gila drainage)	SC
spikedace	<u>Meda fulgida</u>	T
<u>Amphibians &amp; Reptiles</u>		
Arizona Southwestern toad	<u>Bufo microscaphus microscaphus</u>	SC
Chiricahua leopard frog	<u>Rana chiricahuensis</u>	SC
Lowland leopard frog	<u>Rana yavapaiensis</u>	SC
Mexican garter snake	<u>Thamnophis eques</u>	SC
narrowhead garter snake	<u>Thamnophis rufipunctatus</u>	SC
<u>Invertebrates</u>		
New Mexico silverspot butterfly	<u>Speyeria nokomis nitocris</u>	SC
Gila springsnail	<u>Pyrgulopsis gilae</u>	C
<u>Plants</u>		
Chiricahua dock	<u>Rumex orthoneurus</u>	PT
Gila groundsel	<u>Senecio quaerens</u>	SC
Goodding's onion	<u>Allium gooddingii</u>	SC
Hess' fleabane	<u>Erigeron hessii</u>	SC
Mogollon clover	<u>Trifolium longipes</u> var. <u>neurophyllum</u>	SC
Parish's alkali grass	<u>Puccinellia parishii</u>	SC
Santa Fe cholla	<u>Opuntia viridiflora</u>	SC
Zuni (=rhizome) fleabane	<u>Erigeron rhizomatus</u>	T

Note: <sup>a</sup> C--Candidate, CH--critical habitat, E--Endangered, PT--Proposed Threatened, S/A--similarity in appearance, SC--Species of Concern, T--Threatened.

development throughout the area, the demand for these products from nearby public land may increase substantially.

In addition, using commercial woodcutting to accomplish resource objectives could benefit the area's resources. For example, vegetative diversity, forage production, watershed condition, and wildlife habitat could all be improved by using commercial fuelwood cutting to create numerous small, natural-looking openings in the existing vegetation dominated by piñon and juniper.

### **Shrub-Grasslands**

The shrub-grasslands contribute to vegetative diversity and watershed protection. They also provide wildlife habitat, forage for livestock, and fine fuel to carry natural and/or prescribed fires, making a large contribution to the area's overall ecological health.

### **Riparian/Wetland Areas**

None have been identified.

Inclusion of the units in the NCA under the terms of P.L. 100-225 would stop commercial timber and woodland product sales, but would not affect home fuelwood sales, grazing or riparian/wetland area management.

### **Fire Management**

Fire management in the SFO Units is primarily suppression oriented, using an appropriate management response to each wildfire. Over the past 10 years, however, no wildfires have been recorded on SFO lands in this area, nor have any prescribed burns been implemented. Significant urban/interface areas have been developed adjacent to both units, making carefully planned and coordinated fire management even more important.

The vegetative resources in the units evolved with fire and are fire dependent. The past 100 years of fire suppression and grazing in the area has negatively impacted these resources by increasing woody species such as piñon, juniper and shrubs, while reducing the amount of understory vegetation such as grasses and forbs. This further reduces the potential for a natural fire regime of frequent, low-intensity fires and moves the area into an infrequent, high-intensity regime.

Good potential exists to use fire to manage the vegetative resources in this area and correct some unnatural situations caused by fire exclusion. The isolated ponderosa pine stands should be treated with understory burns in the near future to remove the piñon-juniper encroachments, protect the stands from catastrophic wildfire, and improve their regeneration potential. Encroachments of piñon-juniper into grasslands can and should be treated with fire while the trees are still small.

Inclusion of the units in the NCA would not affect the use of fire for resource management.

### **Lands & Realty** **(Including Boundary Adjustments)**

#### **Land Ownership**

Three private parcels are included within the SFO Units. The 5,000-acre Techado Mesa-SFO Unit includes a single 40-acre parcel of private land. The 10,100-acre Tank Canyon-SFO Unit includes two private parcels totaling 200 acres.

In the early 1970s, a large block of private land that was part of the Criswell Ranch was sold as small parcels. Recently, a number of subdivisions have been developed in rural areas throughout Catron County. On December 15, 1997, the Catron County Commission approved Phase I of the Wild Horse Subdivision located west of the Tank Canyon-SFO Unit. The proposed subdivision includes private lands situated between the Tank Canyon and Techado Mesa-SFO Units. Preliminary plans for this subdivision indicate that as many as 10 phases could be developed.

#### **Acquisition Priorities**

The Socorro RMP identifies the lands in the Tank Canyon area for disposal because they are isolated and difficult to manage. The Techado Mesa lands are identified for retention in support of the El Malpais General Management Plan. The RMP calls for consolidating land ownership by acquisition of nonpublic lands in various zones, with emphasis on certain Special Management Areas (SMAs).

#### **Rights-of-Way & Land Use Permits**

According to SFO records, a single right-of-way is authorized in the Tank Canyon area for a Western



New Mexico Telephone Company line. No rights-of-way are on record for the Techado Mesa area.

The Tank Canyon-SFO Unit includes the Newton Site SMA, which is in a designated right-of-way avoidance area. According to the *Socorro Right-of-Way Avoidance Plan* (1991), rights-of-way will be allowed in the Newton Site SMA only if needed to administer and manage the area's resources. This unit contains many other archeological sites and historical homesteads.

### **Minerals**

The Techado Mesa-SFO Unit includes approximately 3,000 acres of federal mineral rights in Catron County and about 570 acres of these mineral rights in Socorro County. The Tank Canyon-SFO Unit includes approximately 3,700 acres of federal mineral rights, all within Catron County. No mining claims are on record for either of the two units, nor are pending or active oil and gas leases.

Mineral potential is an assessment of the favorability or probability that a mineral resource occurs in substantial enough concentrations to be exploited economically. A subjective classification of high, moderate, low, very low, or unknown is used (McLemore 1986), along with highly, moderately, and less favorable or unknown areas (Gray 1989). High potential/favorability exists in areas of known mines or prospects where geologic and economic data show an excellent probability that mineral deposits occur. Moderate potential/favorability exists in areas where data indicates a good possibility that undiscovered deposits occur in formations known to contain economic minerals. Low potential exists in areas where available data imply the occurrence of mineralization, but indicate a low favorability. Less favorable or unknown areas include those areas where favorability has not been demonstrated.

In the SFO Units, the potential for leasable minerals ranges from less favorable or unknown to moderately favorable. Coal resources are known to exist in the area and the literature indicates a moderately favorable coal potential. Oil and gas potential is less favorable or unknown. A few wells have been drilled in or near the units, but all were dry holes. However, research shows good potential for exploration in Permian and Pennsylvanian age reservoirs present in the area.

A literature search indicates a low or unknown potential for locatable minerals in the proposed units. The potential for saleable minerals is also low to unknown. Research indicates some basalt, cinders and other volcanics are present in the Techado Mesa area. Also, Cenozoic age basin-fill deposits are present in other parts of the units. It is unknown whether these volcanics and fill are of economic quality or quantity.

It is expected that an increased demand for saleable minerals from public land will occur as the result of subdivision developments in the general area. The demands would likely occur in response to the need for surfacing material for road construction and decorative mineral materials for homesites.

Inclusion of the units in the NCA under the type of management specified in P.L. 100-225 would result in a mineral withdrawal. Federal minerals would not be available for development except under valid existing rights. Privately owned minerals (which are of unknown quantities and location) would not be affected.

### **Social & Economic Conditions**

The figures in Table R-2 show that the Catron County population decreased between 1980 and 1990. A 1996 estimate of 2,665 residents shows the numbers increasing again.

The figures in Table R-3 show that employment between 1985 and 1996 has increased from 1,094 to 1,395. The leading sectors are farming, services, state and local government, and retail trade. Personal income by source and earnings by industry are shown in Table R-4.

In 1998 the county received payment in lieu of taxes in the amount of \$296,633. The acres in the SFO Units are some of the lands on which this payment is based.

Inclusion of the SFO Units in the NCA would not likely affect the population, employment or in-lieu-of-tax payment for Catron County.

TABLE R-2

**CATRON COUNTY POPULATION BY RACE AND PARTIAL ETHNIC ORIGIN,  
1980 & 1990**

Population Category	1980		1990	
	Number	Percent	Number	Percent
Female	1,317	48.42	1,214	47.37
Male	1,403	51.58	1,349	52.63
Total	2,720	100	2,563	100
<u>Race/Ethnic Origin</u>				
American Indian, Eskimo, Aleut	0	0	---	---
Asian or Pacific Islander	0	0	---	---
Black	10	.37	---	---
Other Race	41	1.51	27 <sup>a</sup>	1.05
White	---	---	---	---
Hispanic Origin	780	28.68	728	28.40
Non-Hispanic White	1,889	69.44	1,808	70.54

Note: <sup>a</sup> Calculated; race, ethnic origin not identified.

### **Soils & Water**

The Techado Mesa-SFO Unit is associated with the larger Techado Mesa area. There are 17 soil map units in this larger area (identified between three soil surveys) that include a wide range of soil, geology, vegetation and landscapes. These map units have been placed into five broad groups. The following three groups are found in the Techado Mesa-SFO Unit.

The second of the five groups lies on moderately steep to steep ridges and alluvial fans. Soils are shallow and very shallow over sandstone, and have surface textures ranging from gravelly clay loam to gravelly fine sandy loam. The potential for water erosion is moderate to high, while the hazard for soil blowing is high. The vegetative cover is usually grasses with scattered piñon and juniper.

The fourth of the five groups includes areas of steep rock outcrops and escarpments. Soils depths

range from very shallow to deep with coarse to moderately fine textures. The hazards of water erosion and wind blowing range from slight to severe. Vegetation consists of grasses, shrubs and piñon-juniper woodland.

The last of the five groups covers the woodlands from the grass-piñon-juniper complex through the piñon-ponderosa pine to the ponderosa pine forest. Slopes range from 2 to 35 percent on mesa tops, basalt hills, ridges and escarpments. Soil depths range from shallow to deep. Soil textures of sandy loams, stony loams, cobbly loams and cobbly clay loams reflect parent material that includes sandstones, shales and basalts.

The microbiotic soil crust community is represented primarily by cyanobacteria and a foliose lichen tentatively identified as *Xanthoparmelia*. This lichen provides good ground cover and erosion protection under light to moderate grazing. Antelope graze on this lichen.

TABLE R-3

**CATRON COUNTY EMPLOYMENT BY INDUSTRY,  
1985 & 1996**

Industry	1985		1996	
	No. of Jobs	Percent of Total Jobs	No. of Jobs	Percent of Total Jobs
Farm	333	30.44	270	19.35
Non-Farm <sup>a</sup>	761	69.56	1125	80.65
<u>Private</u> (Total)	468	42.78	772	55.34
Agricultural Services, Forestry, Fisheries & Other	42	3.84	59	4.23
Mining	(D) <sup>b</sup>	(D)	12	.86
Construction	46	4.20	80	5.73
Manufacturing	84	7.68	55	3.94
Transportation & Public Utilities	21	1.92	75	5.38
Wholesale Trade	(L) <sup>c</sup>	(L)	(L)	(L)
Retail Trade	91	8.32	173	12.40
Finance, Insurance & Real Estate	(D)	(D)	51	3.66
Services	166	15.17	266	19.07
<u>Government &amp; Government Enterprises</u> (Total)	293	26.78	353	25.30
Federal-Civilian	107	9.78	127	9.10
Federal-Military	13	1.19	10	.72
State & Local	173	15.81	216	15.48
Totals <sup>d</sup>	1,094	100	1,395	100

Notes: <sup>a</sup> Sum of the Private (Total) and Government/Government Enterprises (Total) categories.

<sup>b</sup> (D)--Not shown to avoid disclosure of confidential information. Estimates are included in totals.

<sup>c</sup> (L)--Less than \$50,000. Estimates are included in totals.

<sup>d</sup> Sum of the Farm, Private (Total) and Government/Government Enterprises (Total) categories.

TABLE R-4

CATRON COUNTY PERSONAL INCOME BY MAJOR SOURCE, AND EARNINGS BY INDUSTRY  
(figures reflect thousands of dollars, unless otherwise noted)

Category	1985			1996		
	Number	% of Personal Income	% of Earnings by Industry	Number	% of Personal Income	% of Earnings by Industry
Total Personal Income <sup>a</sup>	22,806	100	na <sup>b</sup>	39,076	100	na
Non-Farm Income	20,061	87.96	na	38,264	97.92	na
Farm Income	2,745	12.04	na	812	2.09	na
Population (thousands)	2.6	na	na	2,665	na	na
Per-Capita Personal Income (dollars)	8,867	na	na	14,663	na	na
<u>Derivation of Total Personal Income</u> Earnings by Place of Work	12,580	55.16	100	20,214	51.72	100
Less: Personal Contribution for Social Insurance	637	2.79	na	1,429	3.66	na
Plus: Adjustment for Residence	193	.85	na	-619	-1.58	na
Equal: Net Earnings by Place of Residence	12,136	53.21	na	18,166	46.49	na
Plus: Dividends, Interest & Rent	5,612	24.61	na	9,704	24.83	na
Plus: Transfer Payments	5,058	22.18	na	11,206	28.68	na
<u>Components of Earnings</u> <sup>c</sup> Wages & Salaries	8,273	36.28	65.76	13,356	34.18	66.07
Other Labor Income	689	3.02	5.48	1,684	4.31	8.33
Proprietor's Income	3,618	15.86	28.76	5,174	13.24	25.60
Farm	1,866	8.18	14.83	-93	-.24	-.46
Non-Farm	1,752	7.68	13.93	5,267	13.48	26.06
<u>Earnings by Industry</u> Farm	2,745	12.04	21.82	812	2.08	4.02
Non-Farm	9,835	43.12	78.18	19,402	49.65	95.98
<u>Private</u>	4,604	20.19	36.60	10,221	26.16	50.56
Agricultural Services, Forestry, Fisheries, & Others	389	1.71	3.09	247	.63	1.22
Mining	(D) <sup>d</sup>	---	---	247	.63	1.22
Construction	598	2.62	4.75	1,862	4.76	9.21
Manufacturing	1,204	5.28	9.57	1,637	4.19	8.10
Nondurable Goods	(D)	---	---	647	1.66	3.20
Durable Goods	(D)	---	---	---	---	---
Transportation & Public Utilities	260	1.14	2.07	1,555	3.98	7.69
Wholesale Trade	79	.35	.63	(L) <sup>e</sup>	---	---
Retail Trade	926	4.06	7.36	1,690	4.32	8.36
Finance, Insurance & Real Estate	(D)	---	---	752	1.92	3.72
Services	1,133	4.97	9.01	2,216	5.67	10.96
<u>Government &amp; Government Enterprises</u>	5,231	22.94	41.58	9,181	23.50	45.42
Federal--Civilian	2,365	10.37	18.80	4,273	10.94	21.14
Federal--Military	63	.23	.50	82	.21	.41
State & Local Government	2,803	12.29	22.28	4,826	12.35	23.87

Notes: <sup>a</sup> Income by place of residence.  
<sup>b</sup> na--Not applicable.  
<sup>c</sup> Earnings by place of work.  
<sup>d</sup> (D)--Not shown to avoid disclosure of confidential information. Estimates are included in totals.  
<sup>e</sup> (L)--Less than \$50,000. Estimates are included in totals.

The 30 soil map units of the El Malpais Allotment have been placed into six broad groups. The following three groups occur in the Tank Canyon-SFO Unit.

Group two, the bottomland association, is found along drainageways, bottomlands and swales. The soils are deep and fine textured on gentle slopes. Vegetation is primarily grasses and shrubs. The hazard for water erosion is moderate for most soils.

Group four is a grass-woodland association with slopes generally less than 10 percent. Soils are moderately deep to deep with sandy loam and fine sandy loam textures. In three areas where gravel or cobbles become significant in the soil, the textures shift to loams and clay loams and depths become shallow. The hazard for water erosion is moderate.

Group five consists of a woodland association on a range of slopes from 2 to 100 percent. Vegetation is an association of piñon, juniper, shrubs and grasses. Soil depths are usually shallow, with textures ranging from gravelly clay loam to sandy loams. The hazard of water erosion is severe for most of the area.

Inclusion of the SFO Units in the NCA would not affect soils or watershed.

### **Visual Resources**

Techado Mesa has rolling topography and a high, steep-sided mesa capped by lava flows. Vegetation is dominated by piñon-juniper woodland and

ponderosa pine forest with some oak/deciduous understory. Small playa lakes form seasonally on the mesa top. Tank Canyon has rolling topography with dominant piñon-juniper vegetation.

Visual resources on the public land within these two units are managed by the Socorro Field Office as Visual Resource Management (VRM) Classes III and IV. The BLM has established a system for evaluating visual values and uses four VRM classes to provide management direction. Classes II, III and IV are assigned based on combinations of scenic quality, sensitivity levels, and distance zones.

The VRM objective for Class III lands is partial retention of the existing landscape character. The level of visible change to the characteristic landscape should be moderate. Management activities may attract attention, but should repeat the basic elements (form, line, color, and texture) found in the predominant natural features of the characteristic landscape.

The VRM objective for the Class IV lands is to minimize impacts from activities and uses through careful location, a low level of disturbance, application of design principles, and repetition of the basic landscape elements. Within lands assigned this management class, major modification of the existing character of the landscape is permitted. The level of change can be high, dominate the view and become a major focus of the viewer's attention.

Inclusion of the SFO Units in the NCA would not affect visual resources nor their management.